The Impact of Maternal Health Literacy on Structures, Interpersonal Processes and Outcomes of Ambulatory Care for Low-Income Latino Children

A dissertation submitted in partial satisfaction of the Requirements for the degree Doctor of Philosophy in Nursing

by

Eileen Katherine Fry-Bowers

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ABSTRACT OF THE DISSERTATION

The Impact of Maternal Health Literacy on Structures, Interpersonal Processes and Outcomes of Ambulatory Care for Low-Income, Latino Children

by

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Doctor of Philosophy in Nursing
University of California, Los Angeles, 2012
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Objective. Child health outcomes depend on a parent’s ability to read, communicate, analyze, and use health information to participate in their child’s care. Low maternal health literacy (HL) may disrupt access to pediatric health care, impede informed parent decision-making, and exacerbate pediatric health disparities. This dissertation explores relationships between maternal (HL), maternal self-efficacy (SE) in communication, interpersonal interactions with health care providers (HCPs), and maternal perception of quality of pediatric ambulatory care.

Methods. A cross-sectional, correlational study of low-income Latina mothers (n = 124) of children 3 months to 4 years examined relationships between socio-demographic characteristics, maternal HL (Newest Vital Sign), social support (Family Support Scale), self-efficacy in communications with providers (Perceived Efficacy in
Patient-Physician Interactions), interpersonal interactions with HCPs (Interpersonal Processes of Care in Diverse Populations Survey) and maternal perception of quality of pediatric ambulatory care (Promoting Healthy Development Survey).

**Results.** Data revealed maternal HL to be a complex construct associated with multiple socio-demographic characteristics including social support, cultural and linguistic factors. Although maternal HL and self-efficacy (SE) were not significantly related, important relationships between maternal SE and informal support, and maternal SE and the communication subscale, “elicits concerns,” were identified. Overall, maternal HL was related to the successful transmission of anticipatory guidance, the delivery of family centered care and the helpfulness of information provided, but it contributed less to the quality variables than hypothesized. Conversely, maternal-HCP interpersonal processes were substantially related to maternal perception of the quality of pediatric ambulatory care and significantly predicted each mother’s perception of the quality of pediatric ambulatory health care received.

**Conclusion.** Maternal HL may be a more dynamic concept than previously understood. This study reveals the important role that interpersonal processes play in the mother-HCP exchange. “Speaking with clarity,” “explaining results fully” and “working with a parent” to determine a child’s plan of care is most predictive of whether a mother feels that her child is receiving quality ambulatory care services. Clarifying the relationships between these variables is an important step towards understanding how these factors impact maternal interaction with the health care system and influence pediatric health disparities in this population.
The dissertation of Eileen Katherine Fry-Bowers is approved.

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DEDICATION

I dedicate this dissertation to my husband, Michael, and my sons, Liam and Colin. I am deeply thankful for their unwavering support and patience. I would also like to express my gratitude to my parents for a lifetime of encouragement and for always being ready to “fill in the gaps.” Finally, I am sincerely grateful for the kindness and encouragement of dear friends and colleagues who have travelled this journey with me.
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## PUBLICATIONS AND PRESENTATIONS


HONORS / AWARDS

Chancellor’s Fellowship / Regents Scholar, University of California, Los Angeles, 2008-2011

Dean’s Citation Award, Whittier Law School, 2006
CHAPTER ONE

Background and Significance

The modern health care system demands a great deal from the health care consumer. An increased need for self-management requires individuals to assume new roles in seeking, interpreting and using information to make health-related decisions for themselves and others (Nielsen-Bohlman, Panzer, & Kindig, 2004). According to the 2003 National Adult Literacy Survey (NALS) however, over 90 million Americans, or approximately one half of the adult population of the United States, lacks the capacity to sufficiently read, comprehend, and act on medical information, and interact adequately with the health care system (Nielsen-Bohlman et al., 2004). This capacity, commonly labeled as “health literacy” (HL), comprises numerous skills beyond those of reading and writing, and includes numeracy, speaking and listening abilities. Importantly, it is significantly influenced by one’s cultural and conceptual knowledge (Nielsen-Bohlman et al., 2004). In addition, one’s level of HL appears to be strongly associated with one’s level of educational attainment, race, ethnicity, age, and English-speaking ability (Keller, Wright, & Pace, 2008; Nielsen-Bohlman et al., 2004).

Evidence to date suggests that limited HL negatively impacts health- and illness-related knowledge, health behaviors including adherence, and health outcomes. As a result, HL contributes to substantial increases in morbidity and mortality in adult populations (Baker et al., 2002; Baker et al., 2007; DeWalt, Berkman, Sheridan, Lohr, & Pignone, 2004; Gazmararian, Williams, Peel, & Baker, 2003). Specifically, adult patients with low HL possess poor knowledge of chronic conditions (Gazmararian et al., 2003); lack ability to navigate an increasingly complex health care system (Bade, Evertsen, Smiley, & Banerjee, 2008); have an increased risk of hospitalization (Baker et al., 2002) and an increased risk of mortality (Baker et
al., 2007) when compared to those with higher levels of HL. Low HL is also linked to decreased use of preventive services (Lindau et al., 2002; Scott, Gazmararian, Williams, & Baker, 2002); limited understanding of one’s medical condition (Gazmararian et al., 2003; Kalichman et al., 2000); poor adherence to medical instructions, inadequate self-management skills, and reduced health status in adult populations (DeWalt et al., 2004; Kalichman & Rompa, 2000). Thus, low HL interferes with effective self-management and collaborative care, can impede receipt of benefits from advances in health care, and further exacerbate health disparities (Schillinger, Bindman, Wang, Stewart, & Piette, 2004).

Persons with poor HL also incur higher medical costs and use an inefficient combination of services than their more literate counterparts (Howard, Gazmararian, & Parker, 2005). The Institute of Medicine (IOM) estimates that additional health care expenditures due to low HL skills approximate $73 billion, while Vernon and colleagues (2007) place total costs to the U.S. economy between $106 and $238 billion per year. Accordingly, the IOM (2003) identified “improving HL” as one of two “cross-cutting” issues that require attention to improve health care quality. In addition, Healthy People 2020, calls for “closing the gap in HL” as a means of reducing health disparities (Office of Disease Prevention and Health Promotion, 2000).

**Low Parental Health Literacy Impacts Child Health**

Despite an expanding body of literature on HL and health outcomes in adult populations, very few studies have assessed the relationship between parental, caregiver or child HL and pediatric health outcomes, including pediatric growth and development. Yet recent evidence indicates that a large number of U.S. parents possess limited HL skills and that low parental literacy impedes appropriate parental understanding and administration of pediatric medications (Sleath et al., 2006; Yin, Dreyer, Foltin, Van Schaick, & Mendelsohn, 2007). For example,
nearly half of all parents were unable to perform 1 of 2 medication-related tasks and 59% reported difficulty understanding over-the-counter medication labels (Yin et al., 2009). More generally, two thirds were unable to calculate the annual cost of health insurance based on family size, and nearly 70% were unable enter names and dates correctly on health insurance forms (Yin et al., 2009).

Further, in a population of children with asthma, parents with low literacy had a greater incidence of emergency department visits, hospitalizations, and greater use of “rescue” medications as well as increased days missed from school, even after adjusting for asthma-related knowledge, disease severity, medication use, and other socio-demographic factors (DeWalt, Dilling, Rosenthal, & Pignone, 2007). In addition, parents with limited HL worried more and perceived greater overall burden from their child’s asthma even when reported use of health services was controlled (Shone, Conn, Sanders, & Halterman, 2009). Finally, maternal and child reading test scores were the strongest independent determinants of glycemic control in children with type I diabetes (Ross, Frier, Kelnar, & Deary, 2001). Importantly, additional evidence indicates that parents with less than a high school education had eight times the odds of being categorized as low health literate (Yin et al., 2009).

In contrast to these findings, while parental HL scores correlated with parental perception of severity of child illness, they did not correlate with use of preventive services, comprehension of diagnosis, medication name and instructions, or ability to obtain and administer prescribed medications among parents seeking care for their children in a urban public hospital (Moon, Cheng, Patel, Baumhaft, & Scheidt, 1998). In addition, low health literate caregivers were twice as likely to report high adherence to a daily multi-vitamin with iron regimen in infants as caregivers with adequate HL in adjusted analysis (Hironaka, Paasche-Orlow, Young, Bauchner,
Moreover, lower-literacy respondents seeking care at a pediatric residency clinic reported higher quality parent-provider relationships than their more literate counterparts (Rosenthal et al., 2007). Further, no differences in health care use or cost between children of caregivers with low HL and children of caregivers with adequate HL existed among an inner-city, ethnic minority population (Sanders, Thompson, & Wilkinson, 2007). Notably, few studies distinguish between maternal or paternal HL when assessing impact on child health even though parental gender may influence their role in providing health care to their child (Dickinson & Dignam, 2002; Wathen & Harris, 2007). Interestingly, these studies also did not examine whether other supports including access to knowledgeable familial or other social support potentially mitigated the impact of low HL in one or both parents or primary caregivers.

These conflicting results suggest an incomplete understanding of HL and its relationship to other factors associated with parental interaction with the health system. These findings suggest that like adult populations, the effects of low parental HL may be significant but more evident in the management of chronic conditions. Further, since children often rely on a variety of individuals for care, such as parents, grandparents, siblings, babysitters, and teachers, adequate literacy in one or more of these caregivers may be “protective” and mitigate negative outcomes resulting from care by a lower literate caregiver. Nevertheless, low parental HL may impede both verbal and written communication and interfere with the development of high-quality parent-provider relationships resulting in suboptimal pediatric health care. Child health outcomes not only depend on a parent’s ability to read health information but also upon the abilities to extract, communicate, analyze and use health information to participate in their child’s care, and upon their confidence to do so (Ishikawa, Takeuchi, & Yano, 2008). As a result, limited parental HL may substantially disrupt access to
pediatric health care, impede informed parent decision-making and exacerbate pediatric health disparities (Yin et al., 2009).

Health Literacy, Interpersonal Processes of Care and Self-Efficacy

Importantly, HL remains an evolving concept. Although the relationship between HL and health outcomes is well documented, the causal mechanisms remain unclear. As noted above, while the current definition of HL implies a multifaceted concept, reading ability is frequently viewed as its most fundamental component (Wolf et al., 2009). Certainly, reading ability impacts whether one can comprehend and take action to improve health, however, the complex nature of the current health system presents challenges for numerous people. Consequently, exploring the associations between functional literacy skills and a larger set of cognitive and psychosocial abilities is necessary to further elucidate the concept of HL (Wolf et al., 2009). Specifically, self-efficacy in communication and interpersonal processes may play essential roles in an individual’s level of HL or their capacity for developing HL.

Interpersonal processes of care. Interpersonal processes of care include social-psychological aspects of the patient/parent-provider interaction such as communication, friendliness, explanations, and being caring and sensitive to patient’s needs (Stewart, Napoles-Springer, & Perez-Stable, 1999). Effective interpersonal processes may result in greater exchange of information, improved patient knowledge and increased capability for self-management of health or illness (Stewart et al., 1999). In particular, effective parent-provider communication is associated with parental satisfaction with care, adherence to treatment recommendations, the building of trust in the therapeutic relationship and improved discussion of psychosocial concerns (DiMatteo, 2004; Nobile & Drotar, 2003). Conversely, deficient interpersonal processes coupled with discrepant patient/parental and provider beliefs, perceptions
and expectations regarding care negatively impact the interaction and strongly influence parental behavior (Hart, Drotar, Gori, & Lewin, 2006; Nobile & Drotar, 2003).

Low HL, possibly characterized by communication or information processing problems that extend beyond reading ability, may substantially influence the participatory dimensions of the patient-provider relationship, shape patient decision-making and affect involvement in care (Schillinger et al., 2004; Schillinger et al., 2003). In particular, patients with low literacy ask fewer questions about their medical care which may affect their ability to learn about their medical conditions and treatments (Katz, Jacobsen, Veledar, & Kripalani, 2007).

**Self-efficacy, communication and interaction.** Self-efficacy in patient-provider interactions and communication may play a key role in health related communication, particularly in patients with limited HL. Self-efficacy influences information exchange, satisfaction with care, self-management and patient outcomes (Heisler, Boulknight, Haywood, Smith, & Kerr, 2002; Sarkar, Fisher, & Schillinger, 2006). In fact, low self-efficacy in patient-provider interactions results in decreased satisfaction with care, diminished confidence in providers and worse symptom distress (Maliski et al., 2004). Significantly, one’s level of HL has been identified as a predictor of self-efficacy in the context of diabetes, HIV-self care and colorectal screening (Ishikawa et al., 2008; von Wagner, Semmler, Good, & Wardle, 2009; Wolf et al., 2007).

Unfortunately, numerous studies indicate suboptimal parent-provider communication within primary care (Nobile & Drotar, 2003). Furthermore, although research indicates that low HL affects the explanatory/participatory dimensions of patient–physician communication and patient empowerment (Schillinger et al., 2004), evidence further suggests that less than half of health care providers routinely incorporate into practice appropriate methods of communication
with low health literate patients (Schlichting et al., 2007; Schwartzberg, Cowett, VanGeest, & Wolf, 2007). In a recent query of community health center providers, which frequently serve low-income, racial/ethnic minority and elderly clients, all of whom are at risk for limited HL, 62% of providers considered HL to be a low priority compared to other patient needs (Schlichting et al., 2007). Comprehensible child health information is vital to any parent; yet, a provider’s interaction with a parent may influence her perceptions and subsequent decisions as much as any information, written or oral, conveyed. Low HL is bound to affect the very character of the patient-provider relationship (Williams, Davis, Parker, & Weiss, 2002) and may influence a parent’s ability to engage information sources or alter her information exchange, both of which may decrease her ability to participate in shared decision making and impact her perception and use of pediatric health services (Edwards, Davies, & Edwards, 2009).

As discussed, low HL is strongly associated with low educational attainment, low income, race, ethnicity, age, and limited English-speaking ability (Kutner, Greenberg, Jin, & Paulsen, 2006; Paasche-Orlow, Parker, Gazmararian, Nielsen-Bohlman, & Rudd, 2005). Notably, low income and socially marginalized individuals often possess lower self-esteem, lower self-efficacy and a lower sense of self-mastery, and frequently experience worse health outcomes than their better off counterparts (Baker et al., 1996; Blacksher, 2002). As noted, self-efficacy can influence, or be influenced by, information exchanged and satisfaction with care (Maliski et al., 2004). Moreover, low-income women and those with decreased educational attainment are at substantial risk for dissatisfaction with provider communication (Hawley et al., 2008; Perez, Sribney, & Rodriuez, 2009; Smith, Dixon, Trevena, Nutbeam, & McCaffery, 2009). Importantly, women are often the primary seekers of health care and health information for their families (Wathen & Harris, 2007). Thus, understanding the interrelationships between maternal
socio-demographic characteristics, level of HL, perception of interpersonal interactions, self-efficacy in parent-provider communication, especially among minority populations, is a vital step in addressing pediatric health disparities.

**Quality of Pediatric Ambulatory Health Care Services**

Children depend on adults to obtain the health care that they need as well as to determine whether quality care was received. In general, children are healthy and experience low rates of morbidity and mortality, and health outcomes are skewed toward the higher ends of the health continuum (Mangione-Smith & McGlynn, 1998). Thus, preventive care in pediatrics, including the communication of anticipatory guidance recommendations, is emphasized and plays a substantial role in determining quality of pediatric care received. Unfortunately, problems with timeliness, accessibility, effectiveness, efficiency and equity of children’s healthcare are well documented (Agency for Healthcare Research and Quality, 2002). For example, although approximately two-thirds of parents reported that their children's health providers always listened carefully to them or their children, Latino children were the least likely to have their parents report that their providers always listened carefully to them and uninsured children were less likely than children with private insurance to have their parents report that their providers always listened carefully to them (Agency for Healthcare Research and Quality, 2002). Moreover, Latino children were less likely than White or Black children to have their parents report that their providers always explained things in a way they could understand and uninsured children and children with public-only insurance were also less likely to have providers who always explained things in a way that could be understood than children with private insurance. In addition, uninsured children were less likely than privately insured children or children with public-only insurance to have their parents report that their providers always showed respect for
what they had to say. Finally, while just over half of all children were reported to have health providers who always spent enough time with them and their parents, Latino children were less likely than Black children to have their parents indicate their providers always spent enough time with them. In addition, uninsured children were less likely than those with private coverage to have their parents report that their providers always spent enough time with them (Agency for Healthcare Research and Quality, 2002).

**Structure-process-outcome.** Donabedian asserts that quality of care may be measured by assessing the structure, process or outcomes of care (Donabedian, 1988). Structural characteristics have historically been defined as features of the health system characteristics and types of health insurance (Donabedian, 1988), but more recently population or client characteristics have also been included, either as antecedents to structure or as structural variables (Coyle & Battles, 1999; McGlynn, 2007; Mitchell, Ferketich, & Jennings, 1998; Yen & Lo, 2004). Process consists of what happens during a patient/parent-health care provider encounter while outcomes validate the effectiveness and quality of care (Donabedian, 1966). Significantly, Donabedian argues that the most direct route to assessing quality of care is via an examination of the processes of care (Donabedian, 1988; Mangione-Smith & McGlynn, 1998). Informational processes, such as communication, may, indeed, be at the heart of these processes of care (Stewart et al., 1999). In fact, Nutbeam (2000, 2008) suggests that HL is a multi-leveled, concept that incorporates cognitive development and personal abilities which substantially influence communication skills. Thus, given the potential impact of HL on communication as described above, an in-depth exploration of the inter-relationships between HL, additional antecedents, structural characteristics, processes of care and the quality of pediatric ambulatory health care is warranted.
The Purpose of this Study

This study examined the relationships between maternal HL, maternal perception of interpersonal interactions with providers, maternal self-efficacy in communicating with providers, and the perceived quality of ambulatory health care services received among a low-income, Latino pediatric population.

Specific Aims

In a sample of low-income Latina mothers obtaining ambulatory health care services for young children in the inland region of southern California, this cross-sectional, exploratory study:

1. Describes the levels of maternal HL, maternal perception of interpersonal interactions with providers, maternal self-efficacy for communicating with health care providers, and perceived quality of pediatric ambulatory care.

2. Analyzes associations between maternal HL, acculturation and primary maternal language used, and maternal access to other adult support.

   a. Hypothesis 2: Maternal health literacy will be significantly associated with maternal education level, maternal access to other adult support, primary maternal language used, child insurance status and access to regular source of care.

3. Analyzes associations between maternal health literacy and a) self-efficacy for communicating with health care providers, b) maternal perception of interpersonal interactions with providers by subscale, and c) maternal perception of quality of pediatric ambulatory care received by subscale, respectively.

   a. Hypothesis 3a: Maternal HL will be significantly associated with maternal self-efficacy for communicating with providers when controlling for statistically significant demographic antecedents and structure covariates, such as maternal education level, maternal access to other adult support, primary maternal language used, child insurance status and access to regular source of care.
b. Hypothesis 3b: Maternal HL will be significantly associated with each one of the subscales of interpersonal interactions with providers when controlling for statistically significant demographic antecedents and structure covariates, such as maternal education level, maternal access to other adult support, primary maternal language used, child insurance status and access to regular source of care.

c. Hypothesis 3c: Maternal HL will be significantly associated with each one of the subscales for maternal perception of primary ambulatory care received when controlling for statistically significant demographic antecedents and structure covariates, such as maternal education level, maternal access to other adult support, primary maternal language used, child insurance status and access to regular source of care.

4. Predicts associations between maternal perception of interpersonal interactions with providers by subscale, and maternal perception of quality of primary pediatric ambulatory care received by subscale, respectively, while controlling for maternal HL and other pertinent demographic variables.

   a. Hypothesis 4a: Maternal self-efficacy for communicating with providers will be significantly predictive of maternal perception of quality of primary pediatric ambulatory care received for each one of the quality of care subscales when controlling for statistically significant demographic characteristics, and structural covariates as noted above, as well as maternal HL and maternal perception of interpersonal interactions with providers.

   b. Hypothesis 4b: Maternal perception of interpersonal interactions with providers, measured by subscale, will be significantly predictive of maternal perception of quality of primary pediatric ambulatory care received by subscale, when controlling for statistically significant demographic characteristics, and structural covariates as noted above, as well as maternal HL and maternal self-efficacy.

By investigating the maternal parent-provider relationship within the context of maternal HL, heretofore inadequately described, we clarify the relationships among these factors for this population, identify children at risk for suboptimal ambulatory care and ultimately, provide guidance for the development of appropriate interventions for use in caring for this population to improve child health outcomes, particularly in this and other vulnerable pediatric populations.
Content of this Dissertation

Chapter One discusses the background and significance of HL in relation to health care outcomes and suggests possible cognitive and psychosocial factors that may influence an individual’s HL or capacity for HL. Chapter Two reviews relevant current literature regarding the impact of HL on health outcomes, in particular pediatric health outcomes, and assesses the roles that self-efficacy in communication, and interpersonal interactions with providers, play in achieving optimal health for specific populations. Chapter Three reviews Donabedian’s structure-process-outcome model (1980) as modified by Coyle and Battles (1999) which serves as the unifying conceptual framework for this investigation. In addition, the chapter discusses Nutbeam’s conceptualization of health literacy (2000, 2008), Bandura’s Social Learning Theory, specifically his conceptualization of self-efficacy (1977), and the conceptual framework of interpersonal processes of care by Stewart, Nápoles-Springer and Pérez-Stable (1999). Chapter Four describes the methods and procedures used to quantitatively examine the relationships between maternal HL, the cognitive and psychosocial processes that influence interactions with health care providers as described herein, and the quality of ambulatory health care services received. The results of this investigation are reported in Chapter Five, which is comprised of three manuscripts:

1. A targeted literature review: Parent-Provider Communication within the Context of Limited Health Literacy: A Literature Review
2. Data-based paper #1 (specific aims 1, 2, 3a & 3b): The Association of Health Literacy, Social Support, and Self-Efficacy with Interpersonal Interactions with Health Care Providers in Low-Income Latina Mothers
3. Data-based paper #2 (specific aims 1, 3c & 4a): Health Literacy and Interpersonal
Interactions as Predictors of Maternal Perception of Ambulatory Care for Low-Income, Latino Children

Chapter Six concludes the dissertation and offers suggests for further research in this area to improve our conception of maternal HL and guide appropriate interventions to improve child health outcomes, particularly in vulnerable populations.
References: Chapter One


CHAPTER TWO

Introduction

Health literacy (HL) is frequently defined as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (Nielsen-Bohlman, Panzer, & Kindig, 2004). Importantly, HL comprises numerous skills beyond those of reading and writing, and includes speaking, listening, and numeracy, each of which is mediated by education, language, cultural and conceptual knowledge (Nielsen-Bohlman et al., 2004). Indeed, HL is a shared function of social and individual factors (Dennison et al., 2010). For these reasons, an individual’s HL should be defined and evaluated based on their interaction with the society in which they live, including its health care providers and health-care system, and in relation to society’s ability to appropriately communicate health information to them (Lee, Arozullah, & Cho, 2004). Thus, it is essential to explore those factors that may mediate or moderate the impact of HL on an individuals’ health.

This review of literature explores the concepts of HL, self-efficacy, and interpersonal and communicative interactions within the health care setting. In addition, these concepts are further examined within the context of parental perception of the quality of pediatric ambulatory health care services received. The databases PubMed/MEDLINE, CINAHL and PsycInfo were searched for English-language articles published from 1996 to 2011 using the following search terms, “health literacy,” and “literacy,” in combination with “self-efficacy,” “communication,” “interaction,” “child/pediatric,” and “parent/father/mother.” Studies examining any combination of these concepts are emphasized. Frequently cited references regarding HL and adult
health outcomes are briefly addressed while an in-depth examination of the few publications that have assessed the impact of HL on pediatric health outcomes, parent-provider communication, parental self-efficacy and pediatric ambulatory health care is provided.

**Review of the Literature**

In 1992, the National Adult Literacy Survey (NALS) revealed that nearly half of the adult population of the United States, over 90 million people, were not equipped to meet the literacy requirements of the coming century (Kirsch, Jungeblut, Jenkins, & Kolstad, 2002). These findings raised concerns regarding the capacity of individuals to adequately function in a variety of settings under diverse circumstances, including interacting with the health care system. A new term, “health literacy,” (HL) was introduced and represented a person’s ability to read, comprehend and act on medical information, and interact with the health care system (Schwartzberg, VanGeest, & Wang, 2005). In 2003, a revised NALS included specific measures of HL and survey results revealed that nearly 100 million Americans possessed below basic or basic levels of HL (Nielsen-Bohlman et al., 2004). Moreover, although equivalent nationally representative, population-based studies of HL do not exist, a subsequent pooled analysis of 85 studies, which included data on 31,129 subjects, revealed the weighted prevalence of low and marginal HL among study participants to be 46% (Paasche-Orlow, Parker, Gazmararian, Nielsen-Bohlman, & Rudd, 2005). Given the prevalence of low HL among adult Americans, the IOM (2003) identified “improving HL” as one of two “cross-cutting” issues that require attention to improve health care quality.
Health Literacy

Low HL is strongly associated with low educational attainment, race, ethnicity, age, and English-speaking ability (Keller, Wright, & Pace, 2008; Paasche-Orlow & Wolf, 2007). Individuals with low HL possess poor knowledge of one’s medical or chronic conditions (Williams, Baker, Honig, Lee, & Nowlan, 1998; Williams, Baker, Parker, & Nurss, 1998), poor adherence to medical instructions, inadequate self-management skills, and reduced health status (DeWalt, Berkman, Sheridan, Lohr, & Pignone, 2004). In addition, when compared to those with higher levels of HL, they have decreased use of preventive services, experience delayed diagnoses (Gazmararian, Williams, Peel, & Baker, 2003; Williams, Baker, Parker, et al., 1998), lack ability to navigate an increasingly complex health care system (Bade, Evertsen, Smiley, & Banerjee, 2008), have an increased risk of hospitalization (Baker, Parker, Williams, & Clark, 1998) and an increased risk of mortality among adults (Baker et al., 2007). Moreover, persons with poor HL incur higher medical costs and use a more inefficient combination of services than their more literate counterparts (Howard, Gazmararian, & Parker, 2005). Indeed, researchers estimate that low HL may cost the U.S. economy between $106 and $238 billion per year (Vernon, Trujillo, Rosenbaum, & DeBuono, 2007). Given the associations between low educational attainment, race, ethnicity, age, and English-speaking ability, HL likely contributes to health disparities. Importantly, Healthy People 2010, as well as 2020, suggests that health disparities can be reduced by “closing the gap in HL” (Office of Disease Prevention and Health Promotion, 2000). Further, recent federal policy initiatives, including the Affordable Care Act of 2010, the Department of Health and Human Services’ National Action Plan to Improve Health Literacy, and the
Plain Writing Act of 2010, all seek to improve HL as a means of addressing issues of health care access, quality, and cost (Koh et al., 2012).

**Health Literacy and Health Outcomes in Adult Populations**

In an early, oft-cited cross-sectional study, Williams and colleagues (Williams, Baker, Parker, et al., 1998) examined the relationship between functional HL level and knowledge of chronic disease and treatment among patients 402 patients with hypertension and 114 patients with diabetes in California and Georgia. Sixty-nine percent of Spanish-speaking patients and 22% of English-speaking patients at the California site and 57% of all patients at the Georgia site had inadequate levels of functional HL. When queried, these patients had significantly less knowledge of their disease, important lifestyle modifications, and essential self-management skills (Williams, Baker, Parker, et al., 1998).

Schillinger and team (2002) also examined the relationship between HL and diabetes outcomes in a sample of 408 English- and Spanish-speaking patients at two public clinics in California. Patients with low levels of HL were more likely to have worse glycemic control and to report having retinopathy, after researchers adjusted for socio-demographic variables such as symptoms of depression, social support, treatment regimen and years with diabetes. Other researchers have reported similar findings (Scott, Gazmararian, Williams, & Baker, 2002; von Wagner, Semmler, Good, & Wardle, 2009). The cross-sectional design of these studies limits interpretation, but the findings imply that HL impacts health outcomes for adult patients with chronic illness such as hypertension and diabetes (Schillinger et al., 2002).
Other studies reveal further relationships between limited levels of HL, poor disease specific knowledge and suboptimal self-care by adults with asthma and congestive heart failure (Gazmararian et al., 2003; Williams, Baker, Honig, et al., 1998), as well as poor use of preventive health services, such as cancer screenings (von Wagner et al., 2009) and immunizations among Medicare enrollees (Gazmararian et al., 2003), and higher rates of hospitalization and mortality among the elderly (Williams, Baker, Honig, et al., 1998). In fact, a systematic review of 44 studies revealed that patients with low literacy had less optimal health outcomes, including knowledge, intermediate disease markers, measures of morbidity, general health status, and use of health resources (DeWalt et al., 2004). Importantly, adult patients with low literacy were generally 1.5 to 3 times more likely to experience a poor health outcome (DeWalt et al., 2004). While associations between HL and health status are evident, studies conducted thus far fail to clearly elucidate the mechanisms by which HL influences adult health outcomes.

**Health Literacy and Health Outcomes in Pediatric Populations**

Despite an expanding body of literature on HL and health outcomes in adult populations, few studies assess the relationship between parental, caregiver or child literacy and pediatric health outcomes. The majority of studies to date explore the impact of parental HL on the management of children experiencing chronic illnesses.

**Health literacy and outcomes in pediatric chronic illness.** Dewalt and colleagues (DeWalt, Dilling, Rosenthal, & Pignone, 2007) examined the frequency of health service use as measured by parental-report in 150 children with asthma, aged 3 to 12 years in the southeastern United States. Parental literacy was measured using the Rapid Estimate of Adult Literacy in Medicine (REALM). Children of parents with low
HL had greater incidences of emergency department visits (adjusted Incidence Rate Ratio [IRR] 1.4; 95% Confidence Interval [CI] 0.97, 2.0), hospitalizations (IRR 4.6; 95% CI 1.8, 12), and increased days missed from school (IRR 2.8; 95% CI 2.3, 3.4), even after adjusting for asthma-related knowledge, disease severity, medication use, and other socio-demographic factors. These findings, while biased due to sole reliance on parental report, suggest that among children with asthma, those children of parents with low HL may not benefit from current methods of parental asthma education and self-management techniques but the reasons for this are unclear.

In a school-based setting in upstate New York, Shone (2007) surveyed the parents or caregivers of 499 children with asthma aged 3 to 10 years and discovered that parents with low HL worried more ($p < .001$), and perceived greater overall burden from their child’s asthma ($p < .001$), though reported health care use did not vary. In addition, low HL parents had worse scores for asthma knowledge ($p < .001$), treatment expectations ($p < .001$) and interactions with providers ($p < .001$), and had higher scores for perceived need for medications ($p < .001$). The demographics of the sample, an impoverished and predominantly minority community, limits generalizability of these findings but these results under-score the complicated relationships between HL, chronic illness, race/ethnicity and socioeconomic status.

Finally, in a study conducted in the United Kingdom which measured the influence of parent and child intelligence on glycemic control in children with type I diabetes, Ross (2001) discovered that child age ($r = 0.26, p = 0.02$), and maternal reading test error score ($r = 0.28, p = 0.01$), were the strongest independent determinants of glycemic control in those children. Similarly, Hassan and Heptulla (2010) recently
reported that literacy and numerical skills of caregivers significantly influenced glycemic control of their children with type 1 diabetes treated at the diabetic clinic of a Texas children’s hospital. Specifically, the mean hemoglobin A1C (HbA1C) in those children of parents with low HL (10.4 ± 2.2%) was significantly higher than in those with parents with adequate HL (8.6 ± 1.7%; \( p < .0005 \)). In addition, when controlling for race, language, income and education, multivariate analysis revealed that HL was significantly related to glycemic control (\( p < .004; R^2 = .23 \)) (Hassan & Heptulla, 2010). Thus, like many of the adult studies, HL appears to influence the management and outcomes of chronic illness in pediatric populations. Yet, each of these studies fails to explicate how parental HL influences such outcomes. The present study begin to fill this gap by examining the associations between HL and relevant communicative factors that may predict the successful transmission of education and information necessary for parental management of pediatric health and illness.

**Health literacy and outcomes in pediatric ambulatory health care.** The aforementioned studies investigated parental HL within the context of chronic pediatric illness (e.g., asthma, diabetes). In addition to its impact on care of the chronically ill child, further research suggests that poor caregiver HL also impacts pediatric ambulatory health care received and general pediatric health. Indeed, a large proportion of parents and caregivers appear to possess low levels of HL. In the only large cross-sectional study on a nationally representative sample of US parents done to date, Yin and colleagues (2009) examined parent performance on 13 child health-related tasks. The researchers performed logistic regression analyses to describe factors associated with low parent HL and to explore the relationships between HL and self-reported child health insurance
status, difficulty understanding over-the-counter medication labeling, and use of food labels. Nearly 29% of the parents had below-basic/basic HL, 68.4% were unable to enter names and birth dates correctly on a health insurance form, 65.9% were unable to calculate the annual cost of a health insurance policy on the basis of family size, and 46.4% were unable to perform at least 1 of 2 medication-related tasks (Yin et al., 2009). Only one in seven parents were categorized as possessing a proficient level of HL. Importantly, parents with below-basic HL were more likely to have a child without health insurance in their household (adjusted odds ratio [AOR] 2.4; 95% CI 1.1, 4.9) compared with parents with proficient HL. In addition, parents with below-basic HL had 3.4 times the odds (95% CI 1.6, 7.4) of reporting difficulty understanding over-the-counter medication labels. Significantly, in this sample, HL appeared to account for some of the effects of education, racial/ethnic, immigrant-status, linguistic, and income-related disparities on pediatric health outcomes (Yin et al., 2009).

Recently, Kumar and associates (2010) also demonstrated that many parents struggle to perform tasks associated with the care of young children. In their study of 182 caregivers of children less than 13 months of age, the researchers found that 27% of caregivers could not properly prepare doses of prescription medication and 31% could not read a digital thermometer. Only 53% were able to determine the proper dose of liquid acetaminophen using a dosage chart, just 51% could interpret a percentile on a growth chart, and a mere 18% could understand a commonly used breastfeeding brochure (Kumar et al., 2010). Further, when Bailey and colleagues (2009) asked 373 low-income adults seeking care at family medicine clinics to read a prescription label for a commonly used antibiotic, amoxicillin, and explain how they would give/take the medication, 28%
percent misunderstood medication instructions. Specifically, the prevalence of misinterpreting instructions among the participants with adequate, marginal, and low literacy was 18%, 34%, and 43%, respectively. Reasons for misunderstanding included problems with dosage measurement (28%; for example, a tablespoon instead of teaspoon) and frequency of use (33%; such as every 3 hours instead of every 6-8 hours). When literacy was excluded from analysis, African Americans were more likely to misunderstand instructions than Caucasians (AOR 1.63, 95% CI 1.02, 2.61). With the addition literacy into the model, the association between race and misunderstanding was reduced by 25% and became non-significant (AOR=1.22, 95% CI 0.73, 2.04; \( p = .438 \)). Inadequate and marginal literacy remained independent predictors of misunderstanding (inadequate: AOR 2.90, 95% CI 1.41, 6.00; marginal: AOR 2.20, 95% CI 1.19, 3.97).

Additionally, Kaufman and colleagues (2001) found an association between HL and breast-feeding, with only 23% of the women in the lower literacy group exclusively breast-feeding during the first 2 months compared with 54% of women in the higher literacy group. Fredrickson and associates (1995) measured demographics, reading ability and self-described health behaviors of 646 parents at two private, two university, two indigent and six public child-related clinics in a mid-western city using a bilingual oral interview and the Wide Range Achievement Test (WRAT). Low reading ability was associated with a greater likelihood of smoking cigarettes, a decreased incidence of breast-feeding and an increased rate of not having private of insurance. In addition, homeless mothers in North Carolina with low literacy were significantly more likely to report a barrier to giving their children a needed medication than mothers who read at high school level (Fisher’s exact test, \( p = 0.014 \)) (Sleath et al., 2006). Other studies have
revealed that parents and caregivers with inadequate HL struggle with routine vaccine information (T. C. Davis et al., 1996), as well as other important aspects of pediatric anticipatory guidance (T.C. Davis, Crouch, Wills, Miller, & Abdehou, 1990), even including oral care. For example, among low income female caregivers, after adjusting for age, education and number of children, lower literacy was associated with decreased oral health knowledge (AOR = 1.86; 95% CI = 1.41, 2.45) and poorer reported oral health status (AOR = 1.44; 95% CI = 1.02, 2.05) (Vann, Lee, Baker, & Divaris, 2010).

Finally, in a large cross-sectional survey, Moon and colleagues (1998) assessed parental literacy levels and perception of child illness, use of preventive services, comprehension of diagnosis, medication name and instructions, and ability to obtain and administer prescribed medication in 633 parents accompanying their children for acute care at five sites in Washington, D.C. While literacy scores significantly correlated with parental perception of how sick the child was (r = -.086, p = .0049), they did not correlate with use of preventive services, comprehension of diagnosis, medication name and instructions, or ability to obtain and administer prescribed medications. Notably however, parents at all literacy levels lacked knowledge about their child’s health. In fact, of parents with high-literacy scores, about one third did not know when the next well-child visit was due, and less than two thirds of parents with adequate literacy who were administering prescription medications knew the name of the medication and instructions for use. These findings clearly indicate a need for better communications between health care providers and families, regardless of literacy level (Moon et al., 1998).
In notable contrast to the aforesaid studies however, Sanders and associates (2007) found no differences in health care use or cost between children of caregivers with low HL and children of caregivers with adequate HL among an inner-city, ethnic minority population. Moreover, in a low income, predominantly single mother, African American population (87%), low or marginal maternal HL was not significantly associated with infant immunization status at either 3 months \(p = .78\) or 7 months \(p = .62\) (Pati et al., 2011). One possible explanation for these findings may the fact that since many children often rely on a variety of individuals for care, such as parents, grandparents, siblings, babysitters, and teachers, adequate literacy in one or more of these caregivers may be “protective” and mitigate negative outcomes resulting from care by a lower literate caregiver.

In fact, the presence of social support may moderate the effects of low HL in some populations. As Lee and associates (2004) point out, “[i]ndividuals are social actors, residing in social environments that contain various degrees of support and resources.” As a result, the true impact of low HL on health may be most accurately evaluated when the social support and resources used by low health literate individuals to mitigate negative impacts are considered. For example, as many as 9 to 12 percent of all adults require assistance from family or friends with printed information and filling out complicated forms, and a substantial number of individuals with the lowest levels of literacy, approximately 23 to 25 percent, report needing similar assistance (Lee et al., 2004). Social support, often in the form of familial role models may be especially important for low-income mothers with low HL. Substantial evidence indicates that social support plays a significant role in adherence to preventive and chronic disease
treatment regimens in the care of children and adolescents (DiMatteo, 2004). Thus, positive resources and support in mothers with low HL social networks may improve their ability to acquire and understand medical information, and navigate the health care system (Lee et al., 2004). This may account for some of the conflicting data in the HL studies in the parent/pediatric populations.

Nevertheless, the aforementioned evidence plainly and collectively indicates that substantial literacy demands are placed upon parents seeking to address the health needs of their children and that parental HL appears to be closely linked to children’s health. Yet, while the limited evidence clearly suggests relationships between parental HL and a variety of health outcomes, none of these studies adequately examines those factors that interact with, mediate or moderate the influences of parental HL on the outcomes measured. These findings suggest that like adult populations, the effects of low parental HL may be significant but more evident in the management of chronic conditions. Further, since children often rely on a variety of individuals for care, such as parents, grandparents, siblings, babysitters, and teachers, adequate literacy in one or more of these caregivers may be mitigate negative outcomes resulting from care by a lower literate caregiver. Similarly, positive familial or social support networks may confer some level of “immunity” from the effects of low parental HL. Substantially more data is needed to more fully understand the role HL generally plays in child health outcomes. The results of this dissertation serve to further clarify the impact of maternal HL on specific interpersonal factors that can influence pediatric outcomes within the context of pediatric ambulatory health care services.
Health Literacy and Self-Efficacy

As noted above, substantial evidence indicates that low HL is associated with poor health outcomes, including inappropriate and inefficient use of health services in both adult and pediatric populations. However, limited research to date has attempted to illuminate those factors that mediate or moderate the relationship between low HL and poor health outcomes. Perceived self-efficacy in ability to manage one’s or one’s child’s health may be one such factor.

Self-efficacy is a key component of Bandura’s (1977) social learning theory and can be defined as the belief in one’s capabilities to produce desired results by one’s actions. Self-efficacy is dynamic, reciprocal, and context-bound and related to a person’s perceptions of how she interacts with and is influenced by her environment (Bandura, 1977; Murray-Johnson & Witte, 2003). Lack of knowledge can be an important barrier to self-efficacy (Murray-Johnson & Witte, 2003), thus, limited HL may influence self-efficacy within the context of health care. Furthermore, self-efficacy can influence information-seeking behavior, which may impact health related knowledge and/or HL (H. Ishikawa & Yano, 2008; Shieh, Broome, & Stump, 2010). To date, limited research has considered self-efficacy within the context of HL and even fewer studies examine these constructs within the context of the pediatric setting. Moreover, findings from existing studies of the relationships among HL, self-efficacy and health outcomes differ (Kim & Yu, 2010).

The level of HL has predicted self-efficacy in self-management of chronic conditions, such as HIV (Wolf et al., 2007) and asthma in adults (Mancuso & Rincon, 2006). In addition, HL may also be a factor in self-efficacy for completing cancer
screening (Peterson, Dwyer, Mulvaney, Dietrich, & Rothman, 2007; von Wagner et al., 2009). Yet, although both self-efficacy to manage one’s diabetes and HL or numeracy have been related to glycemic control (Osborn, Cavanaugh, Wallston, & Rothman, 2010; Sarkar, Fisher, & Schillinger, 2006) research to date has not clearly defined the pathways through which these factors relate to each other and impact health outcomes.

In one of the first HL studies incorporating self-efficacy, Sarkar and team (2006) examined the relationship between diabetes self-efficacy and self-management behavior in 408 diverse, low-income, urban adults with a high prevalence of low HL. Self-efficacy was measured with a validated diabetes self-efficacy Likert scale, self-management with the Summary of Diabetes Self-Care Activities Questionnaire and HL with the s-TOFHLA. Diabetes self-efficacy was significantly associated with four of five self-management domains ($p < .01$), and consistent across race/ethnicity and HL levels. Adjusting for HL did not alter the self-efficacy–self-management associations and the authors concluded that carefully designed self-management interventions that target self-efficacy could be effective in populations with inadequate HL (Sarkar et al., 2006).

Osborn and associates (2010) explored the role of self-efficacy as a link between HL/numeracy and glycemic control as measured by hemoglobin A1C (HbA1C). In a cross-sectional study conducted at the primary care and diabetes clinics at three medical centers, researchers enrolled 383 adults with type 1- or type 2-diabetes mellitus. Using path models, they estimated relationships among HL, numeracy, and diabetes self-efficacy as predictors of HbA1C. Health literacy ($r = 0.14, p < .01$) and numeracy ($r = 0.17, p < .001$) were each associated with greater diabetes self-efficacy, and greater diabetes self-efficacy was associated with lower HbA1C levels ($r = -0.25, p < .001$).
When considered in combination, numeracy was related to diabetes self-efficacy 
($r = 0.13, p < .05$), and the effect of HL on diabetes self-efficacy was no longer 
statistically significant ($r = 0.06, p = .30$). Nonetheless, HL and numeracy were each 
associated with greater diabetes self-efficacy, and greater diabetes self-efficacy was 
associated with improved glycemic control. These findings suggest that self-efficacy 
could be an important target of interventions to improve self-management of diabetes 
(Osborn et al., 2010).

Dewalt and colleagues (2007) examined the relationships between literacy, trust, 
self-efficacy and participation in medical decision making in 268 adults with diabetes. 
Health literacy was measured with the REALM and multiple scales measured each of the 
other concepts. No relationship was noted between HL and trust ($p = .70$), or HL and 
facilitation of patient involvement ($p = .15$), although an association between self-
efficacy and HL inched towards significance ($p = .08$). Patients with low HL had 
substantially less desire to participate in medical decision-making ($p < .001$) and 
possessed less diabetes-related knowledge ($p < .001$). Lastly, only self-efficacy trended 
toward a relationship with HbA1C ($r = -.0122, p = .057$) (DeWalt, Boone, et al., 2007). 
Notably, the sample was drawn from a single site with clinical practitioners who likely 
possessed a heightened awareness of HL, which may have biased these results. Even so, 
the relationship between HL and the desire to participate in decision-making is important, 
particularly in an era of health care reform and call for personal responsibility for one’s 
health (Harbage & Gallagher, 2007).

Torres and Marks (2007) also examined relationships between HL, knowledge, 
self-efficacy and decision-making, as measured by intent to take hormone therapy, in a
sample of 106 post-menopausal women. Significantly, behavioral intent to take hormone therapy was positively associated with self-efficacy in patients with low HL ($R^2 = .66, p < .01$), and in those with higher HL levels ($R^2 = .75, p < .01$). Knowledge alone was not related to the decision to take hormones. Conversely, in HIV infected patients, low knowledge levels were associated with low self-efficacy and poor medication adherence (Wolf et al., 2007). In addition, low HL was an independent predictor of low treatment knowledge (AOR 2.4, 95% CI 2.2, 2.6), low medication self-efficacy (AOR 5.8, 95% CI 2.0, 15.7), and medication non-adherence (AOR 3.3, 95% CI 1.3, 8.7) in this population. Thus, two barriers to adequate self-care faced by persons with low HL may be poor context related knowledge and limited self-efficacy (Wolf et al., 2007).

Kim and Yu (2010) specifically examined the mediating effect of self-efficacy on the relationship between HL and health status among 103 community dwelling older Korean adults. Using path analysis, HL significantly predicted physical health ($B = 0.67$, SE = 0.29, $p = 0.02$) and mental health ($B = 0.58$, SE = 0.23, $p = 0.01$) with low HL being associated with poor physical and mental health. Moreover, HL significantly predicted self-efficacy ($B = 0.41$, SE = 0.13, $p = 0.001$). Finally, when controlling for HL, self-efficacy did not significantly predict physical health ($B = 0.33$, SE = 0.28, $p = 0.24$) or mental health ($B = 0.41$, SE = 0.23, $p = 0.08$). Thus, the findings suggest that one mechanism by which HL impacts health status is via self-efficacy (Kim & Yu, 2010).

Researchers have also assessed the associations between HL, willingness and ability to seek information about colorectal cancer (CRC) screening and self-efficacy for receiving screening among 96 participants in the United Kingdom (von Wagner et al., 2009). A multivariate analysis revealed that low HL was associated with less
information-seeking \((b = .079, 95\% \text{ CI}, .001, .157)\) greater effort in reading \((b = -.965, 95\% \text{ CI}, -1.457, -.473)\) and less self-efficacy for CRC screening \((b = .61, 95\% \text{ CI}, .009, .131)\). Therefore in this population, low HL had an impact on information-seeking and was also independently associated with perceived confidence to participate in screening.

On the other hand, in a cross-sectional study of 143 low-income English-speaking pregnant women 18 years and older who were recruited from a prenatal clinic, researchers examined the relationships of HL, self-efficacy, and fetal health locus of control to health information-seeking and found that while self-efficacy \((r = .33)\) and internal fetal health locus of control \((r = .27)\) demonstrated significant correlations with health information-seeking, HL was not significantly correlated with health information-seeking (Shieh et al., 2010). Collectively, this evidence suggests that HL may influence self-efficacy for self-management in some populations and as a result, may impact specific health outcomes. Nevertheless, the means by which this occurs and the populations for whom this is most important remain unclear.

**Parental health literacy and self-efficacy.** To date, only two studies have explored the relationship of HL to self-efficacy within the context of parenting or pediatric caregiving. Dewalt and colleagues (2007) performed a retrospective cohort study of 150 children aged 3 to 12 years with a diagnosis of asthma and a regular source of care and their parent or guardian. Primary asthma care measures included self-reported rates of emergency department visits, hospitalizations, and days of school missed. Secondary asthma care measures included rescue and controller medication use, classification of asthma severity and parental asthma-related knowledge. Children of parents with low HL (24\%) had greater incidence of emergency department visits (IRR
1.4; 95% CI 0.97, 2.0), hospitalizations (IRR 4.6; 95% CI 1.8, 12), and days missed from school (IRR 2.8; 95% CI 2.3, 3.4) even after adjusting for asthma-related knowledge, disease severity, medication use, and other socio-demographic factors. Parents with low HL had less asthma-related knowledge, and 56% of children of parents with low HL had moderate or severe persistent asthma, compared to 35% of children of parents with higher HL (p = 0.03). In addition, children of parents with low HL reported more frequent child use of albuterol (rescue medication) (mean days per week: 2.7 vs. 1.5, p = 0.01) and greater total weekly use (mean: 6 vs. 3 doses per week, p = 0.03) (DeWalt, Dilling, et al., 2007). Interestingly, controlling for parental asthma-related knowledge did not remove the negative association for HL. These results suggest that HL exerts its effects on outcomes in ways that are not knowledge mediated, or that at least are not well reflected in current asthma knowledge measures. Indeed, HL may be related to the ability to acquire self-management or self-efficacious behaviors that are consistent with optimal asthma control (DeWalt, Dilling, et al., 2007).

In the second known pediatric study, Wood and colleagues (2010) explored the relationship between 198 African American parents'/guardians’ levels of HL and their perceived self-efficacy to manage their school aged child’s asthma. Participants were recruited from two pediatric pulmonologists in one office and five pediatricians in another office in a mid-western urban environment. Health literacy was measured using the Newest Vital Sign (NVS) tool while self-efficacy was examined using a 39-item questionnaire developed for the study based upon a comprehensive review of the literature. Nearly two-thirds of parents/guardians had inadequate HL. No significant associations were found between level of HL and frequency of physician visits related to
asthma for the child, frequency of asthma related emergency department visits for the child or the number of times the child had been admitted to the hospital with an asthma related diagnosis (Wood et al., 2010). However, a statistically significant relationship was found among the parents'/guardians’ level of HL and their perceived efficacy to manage their child’s asthma ($r = .155$, $r^2 = .02$). Moreover, as HL literacy scores increased, parental and guardian efficacy scores slightly increased. These findings support the above noted suggestion by Dewalt and colleagues (2007) that HL is an important component of one’s self-efficacy because understanding a health issue can improve one’s ability to deal with it (Wood et al., 2010).

In addition to the aforementioned findings, Wood (2010) also noted a statistically significant relationship between the level of asthma control of the child and the efficacy expectation of the parent/guardian ($r = .170$, $r^2 = .03$). Nonetheless, stepwise linear regression revealed that parents'/guardians’ level of HL did not predict the child’s level of asthma control (Wood et al., 2010). Importantly, the authors noted that while parents'/guardians’ level of HL did not predict usage of asthma control as measured by use of health services, all participants in the study were actively involved in asthma education programs at each study site and this one-on-one parent/guardian education may have mitigated the negative effects of limited HL. In fact, emergency department use and hospital admissions among this child population were lower compared to other studies reporting such use despite that 65% of the parents/guardians possessed limited HL, lending further support to the importance of intensive education for effectively managing chronic illness, particularly in populations possessing inadequate HL (Wood et al., 2010).

Such limited data examining the relationship between parental self-efficacy,
parental HL and pediatric outcomes precludes any conclusions regarding a consistent relationship between these variables. However, the results of the studies by DeWalt and colleagues (2007) and Wood and associates (2010), taken together with data from adult studies, suggests that exploration of a link between self-efficacy and HL, particularly as it relates to communication or health management, remains warranted. The present study explored this potential link and examined the relationships between maternal HL, maternal perception of interpersonal interactions with providers, maternal self-efficacy in communicating with providers and perception of quality of health care received.

**Health Literacy and Patient-Provider Interaction**

During any health care encounter, patients are expected to provide information, respond to questions, and make inquiries associated with their health and illness related concerns. Accordingly, effective interpersonal communication skills are essential for successful patient-provider interactions (Cooper & Roter, 2003; Nielsen-Bohlman et al., 2004). Importantly, prior research indicates that individuals with low HL experience challenges in communicating with providers. For example, these persons demonstrate poor comprehension of provider instructions, ask few questions within a clinical encounter and often report poor satisfaction with patient-provider communication (Baker et al., 1996; Schillinger, Bindman, Wang, Stewart, & Piette, 2004; Schillinger et al., 2003). Moreover, low-income and traditionally underserved populations, specifically at risk for low HL, are also at risk for reporting dissatisfaction with patient-provider communication (Jensen, King, Guntzviller, & Davis, 2010; Sudore et al., 2009; Williams, Davis, Parker, & Weiss, 2002). Further, patient-provider communication is highly correlated with patient adherence and consequently, substantially influences health
outcomes (Haskard Zolnierek & DiMatteo, 2009). Thus, exploration of HL within the context of patient-provider communication can inform our understanding of how HL influences self- or parental-management of health or illness.

Shaw and colleagues (2009) explored the patient’s experience of the doctor-patient relationship among 321 patients with a range of literacy levels at an in-patient cardiology unit in the United Kingdom. Researchers assessed HL using REALM and then asked patients open-ended questions about their experiences of communication with their physicians. Eighty-nine percent of the participants were White, 64% were male and 22% were identified as having low HL. Emergent themes concerned “the transmission of information, the use of language and terminology, interaction with health professionals, and patient self-efficacy among patients with both low and adequate health literacy” (Shaw et al., 2009, p. 116). Many patients felt that health information should be provided in simpler language and most preferred face-to-face communication with their physician. The qualitative design limits the significance of these findings for other populations; yet they are indeed instructive and demonstrate that patient facility with provider communication impacts their care.

Mancuso and Rincon (2006) examined HL and patient-provider communication within the context of asthma patients’ assessment of care and their desire to participate in clinical decision making. The sample comprised a racially diverse group of 175 adult patients with asthma who required daily asthma medications. Using a cross-sectional survey design, investigators measured HL levels using the TOFHLA, patient perception of asthma and experience with health care. Fifty percent of the sample reported dissatisfaction with asthma care. Patients with inadequate or marginal HL were more
likely to report dissatisfaction, even after controlling for demographics \((p = .002)\), as well as greater difficulties with access to care for other conditions \((p = .005)\) and worse results for those conditions \((p = .001)\). Lastly, patients with lower levels of HL were less likely to want to participate in medical decisions \((OR .29, 95\% CI .13, .65, p = .01)\).

Importantly, patient perception and experience were measured with a single question/concept survey tool that had not been previously validated. In addition, the researchers grouped patients with inadequate and marginal HL for statistical analysis, but these groups may, in fact, be quite different. Yet, these findings cannot be ignored. The poor ratings by those with lower HL may indicate inability to communicate needs and concerns to providers. Moreover, failure to understand medical information may lead the lower literate patient to experience poorer outcomes and thus, conclude they receive sub-optimal care (Mancuso & Rincon, 2006).

Ishikawa and associates (2009) specifically examined the association of Nutbeam’s (2000, 2008) three levels of HL, functional, communicative and critical, to patient-physician information exchange during a medical encounter. Visit communication was assessed using the Roter Interaction Analysis System (Roter & Hall, 2006) while patient HL was measured via a newly developed tool assessing the aforementioned levels of HL. Importantly, patient HL was significantly related to the information exchange process during the visit. Specifically, patients with higher communicative HL asked more questions during the visit and perceived that they had actively participated in the visit. Moreover, the patient’s level of communicative HL modified patient perception of physician information-giving, suggesting that HL plays a role in how patients view their medical encounters (Hirono Ishikawa et al., 2009).
Collectively these studies, although only conducted with adults concerned with self-care, begin to illuminate a relationship between an individual’s level of HL and their subsequent interactions with providers during a health care encounter.

**Health literacy and parent-provider interaction.** At present, only one study, discussed below, has been identified which specifically examines the relationships between parental HL and communicative interaction within the pediatric medical encounter. Substantial research however, indicates that effective parent-provider communication is generally associated with parental satisfaction with care, adherence to treatment recommendations, the building of trust in the therapeutic relationship, and improved discussion of psychosocial concerns, an integral component of pediatric ambulatory health care (DiMatteo, 2004; Nobile & Drotar, 2003). Conversely, poor communication, especially among low-income populations, or foreign-born or non-native English-speaking parents, may contribute to poor child health outcomes and exacerbate pediatric health disparities (Clemens-Cope & Kenney, 2007).

Importantly, parent-provider communication differs across the context of pediatric care. For instance, pediatric primary care focuses on anticipatory guidance, periodic ambulatory health care services, episodic illness, and developmental or psychosocial concerns, while chronic illness necessitates comprehensive education about diagnosis, illness and treatment and attendant consequences. Notably, evidence indicates that parent-provider communication, particularly within the context of pediatric primary or ambulatory care may be less than optimal (Hart, Drotar, Gori, & Lewin, 2006). Despite this, few studies have examined clinically relevant correlates of parent-provider communication and only one study identified to date, explicitly examines the
relationships between caregiver or parental HL and specific domains associated with interactive or interpersonal communication between parent and provider.

Rosenthal and colleagues (2007) assessed 157 caregivers, 69% of whom received Medicaid and 34% of whom scored below a ninth-grade reading level who sought care for their children from a single pediatric residency clinic, to determine whether level of parental HL could successfully identify children at risk for sub-optimal pediatric ambulatory health care services. Researchers measured HL using the REALM and assessed the quality of pediatric health care using 5 subscales from the Promoting Healthy Development Survey (PHDS) that were relevant to parent-provider relationships or content of a medical encounter. In unadjusted analysis, parents with low HL were more likely than those with higher HL to report better “family-centered care” (79% vs. 60%, \( p = .01 \)) and “helpfulness and confidence building” (91% vs. 71%, \( p = .006 \)). No difference by level of HL was found for “psychosocial issues,” “safety issues,” or “anticipatory guidance” (Rosenthal et al., 2007). When adjusted in logistic regression models for caregiver gender, race, parents living together, insurance status, income and child age, the associations remained: “family-centered care” (79% vs. 61%, \( p = .03 \)) and “helpfulness and confidence building” (79% vs. 57%, \( p = .01 \)).

These surprising findings require critical examination. Importantly, the researchers grouped patients into two groups, those with low literacy, defined as a REALM score of < 61, and those with high literacy, a REALM score of > 61, which may have masked subtle distinctions between those parents with marginal HL and “low” or “high” HL. Secondly, the cross-sectional study was conducted at a single institution with resident physicians whose institution specific training limits generalizability. Finally,
face-to-face administration of the tools at the institution where they received care for their children may have increased the likelihood that respondents gave socially acceptable answers, particularly when queried regarding parent-provider relationships. Moreover, feelings of marginalization, given respondents’ low socioeconomic status, low education and poor HL levels, may have influenced responses or parental expectations of care (Rosenthal et al., 2007). Nevertheless, these findings must be addressed. Although the means remain unclear, they indicate that parental HL plays some role in the parent-provider relationship and consequently, influences concomitant communication.

While evidence specifically examining the links between patient/parent HL and communicative or interactive domains of the patient/parent-provider relationship are lacking, evidence suggests that associations exist, although the mechanisms by which, remain poorly explicated. Thus, studies, such as the present dissertation, which explore associations between caregiver or parental HL and interaction communication within the context of a pediatric health care encounter are essential.

**Quality of Pediatric Ambulatory Care**

In general, children are healthy and experience low rates of morbidity and mortality, and health outcomes are skewed toward the higher ends of the health continuum (Mangione-Smith & McGlynn, 1998). Thus, preventive care in pediatrics, including the communication of anticipatory guidance recommendations, is emphasized and plays a substantial role in determining quality of pediatric health care received. Unfortunately, research shows that children frequently do not receive care as required by circumstances (95% CI, 44.5 to 48.4) (Mangione-Smith et al., 2007). Moreover, precise and detailed assessment of the quality of children’s health care is limited by a small
number of appropriate measures and few studies despite increased attention to overall the quality of health care (Dougherty & Simpson, 2004; Mangione-Smith & McGlynn, 1998).

Mangione-Smith and colleagues (2007) assessed the extent to which recommended care processes for ambulatory pediatric patients was delivered to children in 12 metropolitan areas across the United Stated. The researchers surveyed the parents of 1536 randomly selected children and examined their medical records from all providers who had seen the children in the prior two-year period. On average, children received 46.5% (95% CI, 44.5 to 48.4) of indicated care. Specifically, the children received 67.6% (95% CI, 63.9 to 71.3) of the indicated care for acute medical problems, 53.4% (95% CI, 50.0 to 56.8) of the indicated care for chronic medical conditions, and 40.7% (95% CI, 38.1 to 43.4) of the indicated preventive care (Mangione-Smith et al., 2007). Importantly, there were higher rates of insurance among study participants than the national norm and the study only included children residing in metropolitan regions who had seen a provider within the last two years. Thus, it is likely that these findings represent greater care than that received by non-insured children, children experiencing gaps in insurance, or those living in rural areas with limited access. In addition, these results reveal that insurance and access to care may not be primary predictors of quality of care received. Other factors, including those discussed throughout this chapter, may substantially influence the quality of pediatric health care for many children.

In another effort to describe the proportion of high-quality basic pediatric preventive services reported by parents (exclusive of immunizations), researchers examined cross-sectional data on 2041 children, 4 to 35 months of age, in the 2000
National Survey of Early Childhood Health (Zuckerman, Stevens, Inkelas, & Halfon, 2004). Specifically, investigators considered receipt of developmental assessment, injury prevention counseling, screening for parental smoking, guidance on reading to the child and guidance on 14 other topics assessed as a composite score. Receipt of services was categorized as excellent, good, fair or poor. While most children received excellent (34.9%) or good (31.5%) care, approximately one fourth of children received fair care (24.9%) and 8.9% of children received poor care (Zuckerman et al., 2004). No disparities in overall preventive care levels based on race/ethnicity, income or child’s health insurance status, were found. Importantly, better levels of care were associated with longer well-child visits (average 20.1 minutes vs. 12.4 minutes, \( p < .0001 \)). In addition, compared to children who received poor care, parents of children who received excellent care rated family-centered care higher (78.3% vs. 42.0%, \( p < .0001 \)), and reported more counseling regarding family and community risk factors (43.9% vs. 10.1%, \( p < .0001 \)). Finally, parents of children with excellent care were more satisfied with overall care (91.8% vs. 77.7%, \( p < .0001 \)) and reported that they were able to ask all of their questions (98.3% vs. 81.1%, \( p < .0001 \)) compared to children with poor care (Zuckerman et al., 2004). Although these results may be biased by reliance on parental report, the authors soundly argue that if a parents do not recall a discussion or receipt of certain information, then the guidance provided was not effectively conveyed—a particularly salient point to consider when assessing the impact of parental HL on quality of pediatric care received (Zuckerman et al., 2004). In addition, the relationship of perceived quality of care to satisfaction with care cannot be ignored. Satisfaction is associated with patient behavior, including use of preventive health services and
adherence to treatment recommendations (DiMatteo, 2004; Halfon, Inkelas, Mistry, & Olson, 2004).

Further research indicates that additional barriers to quality care for children include lack of insurance, lack of continuity with a clinician or place of care, racial/ethnic, gender or language-related barriers, lack of clinician skill, time or awareness and lack of privacy for adolescents (Chung, Lee, Morrison, & Schuster, 2006). As noted previously, inadequate parental HL may also contribute to suboptimal pediatric care. In fact, parents and caregivers of children and adolescents with limited HL skills may experience difficulty in communicating their child’s needs, understanding medical instructions, following recommendations or performing child care tasks, and understanding issues related to consent or risk communication (Rothman et al., 2009).

Communicative interaction is a vital link between parent, child, provider and quality of care delivered and evidence indicates that parents want information regarding the care of their children (Bethell, Peck, & Schor, 2001). In a nationally representative sample of 2017 parents of young children, the majority of whom rated their child’s health as excellent (76%) and identified a regular source of care for their child (88%), 79% reported that they could use more information in at least one of six areas of child rearing and 53% wanted additional information in at least three areas (Young, Davis, Schoen, & Parker, 1998). Most importantly, these parents reported that if pediatric clinicians discussed certain things with them, they responded positively (e.g., by breast-feeding more, 74% vs. 45%, p < .001; by reading more frequently to their child, 47% vs. 37%, p < .001). Although this study did not address parental HL, it demonstrates the importance
and potential impact of clear communication between parents and their child’s health care provider on the overall quality of pediatric ambulatory care received.

Importantly, communication problems may have an even greater impact on the quality of care received by low-income pediatric populations, particularly if the parent is foreign-born or does not speak English well (Clemens-Cope & Kenney, 2007). In fact, an analysis of data from the second and third rounds of the National Survey of America’s Families revealed that within a subgroup of 1632 publically insured children of predominantly Spanish-speaking parents, fully one-third had parents who said that health care providers never or only sometimes listened and explained things carefully (Clemens-Cope & Kenney, 2007). Understanding the factors influencing poor communication in this population is essential since poor communication likely compounds other factors influencing quality of care.

Donabedian asserts that quality of care may be measured by assessing the structure, process or outcomes of care (Donabedian, 1988). Significantly, Donabedian argues that the most direct route to assessing quality of care is via an examination of the processes of care (Donabedian, 1988; Mangione-Smith & McGlynn, 1998). Informational processes, such as communication, may, indeed, be at the heart of these processes of care (Stewart, Napoles-Springer, & Perez-Stable, 1999). Yet, limited research specifically explores the relationship between communicative processes and quality of health care within the context of the pediatric ambulatory health care encounter. Notably, no study was identified which examines these factors in populations at risk for low HL. Importantly, other evidence suggests that disparities in care among some populations may be attributable to differences between minorities and their
counterparts and in the interpersonal processes between patients and providers (Stewart et al., 1999).

Parents play an increasingly important role in the pediatric health care team and are in a unique position to report on the care that their children receive (Sobo, Seid, & Gelhard, 2006). Given the potential impact of HL on interactive communication processes as described throughout, this study begins to fill this gap in the literature with an in-depth exploration of the inter-relationships between maternal HL, maternal self-efficacy in communication, maternal perception of interpersonal communicative processes of care and maternal perception of the quality of pediatric ambulatory health care services received.
References: Chapter Two


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CHAPTER THREE

Introduction

“A theory can be defined as a set of interrelated concepts, constructs, relationships, and principles that present a systematic view of phenomena by specifying relationships among variables, with the purpose of explaining or predicting phenomena” (Coyle, 2000). Specifically, nursing theory seeks to describe phenomena, explain relationships between phenomena, or predict consequences, frequently for the purposes of prescribing nursing care (Meleis, 2007). Importantly, a theory provides the framework within which the researcher can address fundamental questions and helps to identify research designs that can produce the most meaningful results (Coyle, 2000).

As health professionals, nurses must be able to assess the knowledge generated in diverse areas such as physiology, psychology, sociology, leadership, economics and health services. Failure or inability to consider the knowledge relevant to a nurse’s area of work relegates the nurse to functioning as a technician dependent upon others to develop and interpret the knowledge base guiding his or her actions (Hardy, 1973). While nurses integrate the knowledge developed by multiple disciplines, nurses also produce accurate and reliable knowledge shaped by the perspective of the nursing discipline. Often, “the nursing perspective guides the reconceptualization of these existing theories” (Meleis, 2007, p. 158). In addition, nurses generate new knowledge that reflects nursing as a human science, that incorporates the practice aspects of nursing, that reflects the caring relationships developed between nurses and patients and that emphasizes nursing’s orientation to health and wellness (Meleis, 2007). The profession of nursing accomplishes these goals through the use of conceptual or theoretical frameworks to
guide research and the subsequent development of nursing theories or theories for nursing practice (Meleis, 2007).

This dissertation study combines and reconceptualizes several existing multidisciplinary theories to identify and explain the relationships among specific factors that influence a mother’s (or female primary caregiver’s) perception of the quality of pediatric healthcare services her child receives. Specifically, Donabedian’s structure-process-outcome model (1980) (see Figure 1), as modified by Coyle and Battles (1999) (see Figure 2), serves as the unifying conceptual framework for this investigation. In addition, this study is informed by Nutbeam’s conceptualization of health literacy (2000, 2008), Bandura’s Social Learning Theory, specifically his conceptualization of self-efficacy (1977), and the conceptual framework of interpersonal processes of care by Stewart, Nápoles-Springer and Pérez-Stable (1999).

The Structure-Process-Outcome Model

Donabedian’s Model

Donabedian asserted that information about quality of health care rendered and received may be inferred from empirical assessment of the structure, process and outcomes of care (Donabedian, 1980, 1988b).

Structure. Donabedian defined “structure” as the attributes of the settings in which care occurs. Specifically, structure “includes the human, physical and financial resources that are needed to provide medical care” (Donabedian, 1980, p. 81). Moreover, the concept of structure further includes the ways that the financing and delivery of health care services are organized, formally and informally. As a result, structure is relatively stable, functions to produce care, and influences the kind of care provided (Donabedian, 1980). Structure as an indirect measure of care depends on the manner of its influence on care; in other words, structure increases or
decreases the probability of good performance. Donabedian cautions however, that “structure is a rather blunt instrument” to assess quality of care as it reflects only the general tendencies of its attributes (Donabedian, 1980, p. 82). In fact, Donabedian suggests that more detailed, condition-specific structural requirements may improve the sensitivity and specificity of its impact on quality.

**Process.** “Process” consists of what happens during a patient/parent-health care provider encounter and includes the patient’s activities in seeking and adhering to care as well as the provider’s activities in diagnosing, recommending and implementing treatment (Donabedian, 1988b). Donabedian clarifies further that process is comprised of a technical component and an interpersonal component. Specifically, technical process or performance depends on the knowledge and judgment used to manage an episode of care, the quality of which may be judged in comparison with “best practices.” Thus, technical processes “must be judged as good if care, at the time it was given, conformed to practices that could have been expected to achieve the best results” (Donabedian, 1988b, p. 1745). Interpersonal process refers to the interaction between the patient and the provider. Through interpersonal exchange, the patient and provider share information with one another. This exchange is influenced by the communication ability and style of both the patient and the provider. Importantly, it is through this dialogue that providers obtain information needed to make a diagnosis, recommend management and include patients in collaborative decision-making. Accordingly, “the interpersonal process is the vehicle through which technical care is implemented and on which its success depends” (Donabedian, 1988b, p. 1745). Moreover, Donabedian argues that the most direct route to assessing quality of care is via an examination of these processes of care (Donabedian, 1988a; Mangione-Smith & McGlynn,
Process variables provide a way to “theoretically link patient experience to quality of care” (Sobo, Seid, & Gelhard, 2006).

**Outcome.** “Outcomes are those changes, either favorable or adverse, in the actual or potential health status of persons, groups or communities that can be attributed to prior or concurrent care” (Donabedian, 1985, p. 256) and include such things as clinical endpoints, functional status, improvement in patient knowledge, beneficial changes in patient behavior, general well-being and satisfaction with care (Donabedian, 1988b). Consequently, quality can be evaluated based on the extent to which the processes of care achieve intended goals or objectives (Donabedian, 1982). Importantly, for a health outcome to be a valid quality measure, it must be related to a process or processes that can be modified to improve the outcome (Seid, Varni, & Kurtin, 2000).

**Philosophical Foundations, Assumptions and Limitations of Donabedian’s Model**

As described, Donabedian’s model explains relationships between the attributes of structures, processes and outcomes and, as such, is rooted squarely within the philosophical paradigm of empiricism. Donabedian asserts that in order to assess quality of care, concepts of quality, such as the criteria and standards of structure, process and outcome, must be translated into concrete representations that are amenable to some degree of quantification (Donabedian, 1982, 1988b). He further suggests that these criteria and standards derive from sound, scientifically validated knowledge. Specifically, preexisting knowledge of the linkage between structure and process and between process and outcome is essential (Donabedian, 1988b). Moreover, he acknowledges that quality assessment must be rigorously controlled if the purpose is to contribute to current knowledge. As a result, the model requires that specific evaluative criteria be context-dependent. Importantly, by defining quality of care as deriving from
structure-process-outcome, Donabedian seeks to make consistent judgments about care; in other words, use of this model to assess quality should yield information that is meaningful and generalizable and which can be used to guide improvement in care.

Donabedian asserts that “good structure increases the likelihood of good process, and good process increases the likelihood of a good outcome,” implying a casual relationship among these attributes (1988b, p. 1745). Quality is clearly tied to the achievement of goals and objectives (Donabedian, 1982). Yet, particular outcomes are described as the result of multiple precursors thus, the model assumes a broad and multidimensional definition of quality. Health care providers, as well as patients, may possess differing perspectives on what constitutes achievement of these goals and objectives.

In addition to a multidimensional definition of quality, the model also assumes multiple causality regarding outcomes of care, which includes the collective contributions of multidisciplinary providers, as well as the patient and family. Consequently, it can be difficult to assess when an observed outcome is indeed attributable to a specific antecedent process of care (1988b). As a result, the model is really more probabilistic than causal linear. In fact, many causative factors may remain unmeasured or unidentified. Therefore, attributing, with certainty, a specific outcome to the presence or absence of a specific antecedent is not realistic. Yet, adapting criteria and standards to ensure congruence with one’s definition of quality allows for broad and flexible application of the model.

Donabedian’s model was originally formulated from the medical perspective with the purpose of detailing evaluation of medical care processes (Donabedian, 1980). However, it moves beyond traditional notions of a “medical model of care” and acknowledges that the purpose of care is to promote wellness, prevent illness and restore health (Donabedian, 1980).
Thus, the model assumes that health is indeed a multidimensional concept with physical, physiologic, psychological and social aspects that results in a nearly limitless supply of health outcome measures to be assessed. This broad conceptualization is congruent with nursing’s metaparadigm which consists of four central interrelated constructs: person (as an individual, family, and/or community), health, environment and nurse; and with nursing’s broad of goal of fostering adaptation and promoting, maintaining and restoring optimum health in individuals, families, and communities throughout the lifespan (American Nurses Association, 2003).

Specifically, Donabedian’s notion of “structure” acknowledges the significance of environmental resources in access and receipt of health care services. His recognition of “process” underscores the significance of the interrelatedness between patient and health care provider. Finally, his conception of “outcomes” emphasizes change in health status.

Although the Donabedian acknowledges the multidimensionality of health and the multicausality of health outcomes, including the role of the patient in her own care, the model, itself, fails to explicate further the role of patient characteristics in quality assessment. The significance of incorporating various patient characteristics in the assessment of outcomes is well documented and serves as the impetus for supplementing Donabedian’s model with that of Coyle and Battle (Coyle & Battles, 1999).

**Coyle and Battle’s Antecedents of Medical Care**

Donabedian clearly acknowledges that a multitude of implicit as well as explicit factors, such as individual patient characteristics, influence care outcomes (Donabedian, 1988b). Some authors have accounted conceptually for these individual attributes, such as demographic and socio-economic characteristics, under “structure” even though structural characteristics have historically been defined as the human, physical and financial features of the health system.
Donabedian, 1988a). Specifically, recent studies have stretched Donabedian’s notion of structure to include population or client characteristics or differing states of client health and disease risk factors (McGlynn, 2007; Mitchell, Ferketich, & Jennings, 1998; Yen & Lo, 2004). Coyle and Battles (1999) however, expand Donabedian’s structure-process-outcome model to specifically include antecedents of medical care, primarily defined as “patient personal characteristics and their environmental context” (p. 5). Coyle (2000) asserts that this extension of Donabedian’s model is warranted by substantial evidence that indicates that culture, social mobility, life events, psychological status, educational attainment, income level, and employment status, among other factors, each influence health status which, in turn, affects structure-process-outcome.

Coyle and Battle’s adaptation allows for specific quantification of pertinent antecedent factors when assessing quality. Their model explicitly and separately considers the impact of patient characteristics and environmental context on structure, process and outcomes. Consequently, it can be used to risk-adjust the outcomes used to assess the quality of care across providers or populations (Coyle, 2000). To draw inferences about quality of care from health care outcomes, one must adjust for the “intrinsic risk of the patient for experiencing a good or bad outcome” (Hammermeister, Shroyer, Sethi, & Grover, 1995, p. OS9). Contemplation of antecedent factors greatly increases the likelihood of identifying true linkages between structures, processes and outcomes of care because such factors can be measured and statistically controlled revealing more relevant relationships among the variables of interest.

**Antecedent: Health Literacy**

Limited health literacy (HL) contributes to substantial increases in morbidity and mortality in adult populations (Baker et al., 2002; Baker et al., 2007; DeWalt, Berkman,
Sheridan, Lohr, & Pignone, 2004; Gazmararian, Williams, Peel, & Baker, 2003) and several studies indicate that parental or caregiver HL also impacts pediatric health outcomes (Sanders, Shaw, Guez, Baur, & Rudd, 2009). For example, children with asthma whose parents possessed low literacy had a greater incidence of emergency department visits, hospitalizations, and greater use of “rescue” medications as well as increased days missed from school, even after adjusting for asthma-related knowledge, disease severity, medication use, and other socio-demographic factors (DeWalt, Dilling, Rosenthal, & Pignone, 2007). In addition, the parents with limited HL worried more and perceived greater overall burden from their child’s asthma even when reported use of health services was controlled (Shone, Conn, Sanders, & Halterman, 2009). In another notable study, low parental literacy also impeded appropriate parental understanding and administration of pediatric medications (Sleath et al., 2006; Yin, Dreyer, Foltin, Van Schaick, & Mendelsohn, 2007). Finally, maternal and child reading test scores were the strongest independent determinants of glycemic control in children with type I diabetes (Ross, Frier, Kelnar, & Deary, 2001).

Additional evidence indicates that child health outcomes may not depend solely on a parent’s ability to read health information but, more importantly, upon her ability to extract, communicate, analyze and use health information to participate in her own or her child’s care (Ishikawa, Takeuchi, & Yano, 2008; Schillinger, Bindman, Wang, Stewart, & Piette, 2004; Schillinger et al., 2003). Thus, pediatric health outcomes for children of parents or caregivers with low HL may be particularly sensitive to interactive communication (Schillinger et al., 2004; Schillinger et al., 2003). Moreover, limited HL is strongly associated with additional factors such as low educational attainment, low income, race, ethnicity, age, and limited English-
speaking ability (Kutner, Greenberg, Jin, & Paulsen, 2006; Paasche-Orlow, Parker, Gazmararian, Nielsen-Bohlman, & Rudd, 2005).

**Nutbeam’s model of health literacy.** Nutbeam (2000) asserts that literacy should be defined in terms of what it enables individuals to do, and proposes that HL includes three levels:

- **Basic/functional literacy**—sufficient basic skills in reading and writing to be able to function effectively in everyday situations, broadly compatible with the narrow definition of ‘health literacy’ referred to above;

- **Communicative-interactive literacy**—more advanced cognitive and literacy skills which, together with social skills, can be used to actively participate in everyday activities, to extract information and derive meaning from different forms of communication, and to apply new information to changing circumstances;

- **Critical literacy**—more advanced cognitive skills which, together with social skills, can be applied to critically analyze information, and to use this information to exert greater control over life events and situations (Nutbeam, 2000, pp. 263-264).

Nutbeam (2000) further contends that an individual’s progress through these different levels of literacy depends upon their cognitive development as well as their exposure to different communication content and methods, and that one’s responses to communication are mediated by personal abilities, social skills, and self-efficacy in relation to the specific matter (Nutbeam, 2000). In fact, Nutbeam (2000, 2008) suggests that HL is a multi-leveled, scaffolded concept that incorporates cognitive development and personal capacities which substantially influence one’s interactive communication skills and ability to act on information.

As previously noted, interactional processes, such as communication, may, indeed, be at the heart of the Donabedian’s processes of care (Donabedian, 1988b; Stewart et al., 1999). Given the potential impact of HL on parent-provider communication as described above, and more generally, upon overall health outcomes as discussed in Chapter Two, maternal HL is indeed a pertinent variable which can directly or indirectly influence structures, processes and
outcomes of pediatric health care. Thus, maternal HL, quantified using a validated tool, served as a primary antecedent in this study.

**Antecedent: Social Support**

Current research efforts overwhelmingly regard HL as an individual attribute and disregard an individual’s social relationships and networks of support (Lee, Arozullah, Cho, Crittenden, & Vicencio, 2009). Yet, social support may ameliorate the negative effects of low HL in some populations. Many individuals report requiring assistance from family or friends when dealing with health-related information (Lee, Arozullah, & Cho, 2004). Social support, often in the form of familial role models, may be especially important for low-income mothers with low HL and may play a special role for many Latina mothers who often rely on family members for support during a child’s illness or in seeking health care services (Clark, 2002). Additionally, mounting evidence indicates that social support plays a significant role in adherence to preventive and chronic disease treatment regimens in the care of children and adolescents (DiMatteo, 2004). Thus, positive resources and support in mothers with low HL social networks may improve their ability to acquire and understand medical information, and navigate the health care system (Lee et al., 2004). As a result, maternal access to social support and maternal appraisal of the significance of that support was examined as a secondary antecedent in this study. Additional socio-demographic factors as implicated by Coyle and Battles (1999) were included as well.

**Structure: Access to Care**

Access to care exerts strong independent effects on quality of pediatric care (Seid, Stevens, & Varni, 2003). In addition, access to a usual source of care can significantly influence the quality of care received by a child (Dinkevich, Cunningham, & Crain, 1998). Moreover, whether or not a child has some form of insurance, public or private, also impacts their access to
high quality health care services (Vivier, 2005). In fact, access to care further yields strong independent effects on parents’ report of quality of primary care (Seid et al., 2003). Thus, consistent with Donabedian’s model and the Coyle and Battle adaptation, in this study, structure was operationalized as the following variables: the child’s health insurance status, whether care was received at a regular place of care and whether the child saw a regular or consistent provider of care. Each of these variables potentially impacts the processes of care, which in turn can influence outcomes of care.

**Processes: Interpersonal Processes**

According to Donabedian, interpersonal processes, such as communication, may, indeed, be at the heart of the processes of care (Donabedian, 1988b; Stewart et al., 1999). In fact as noted previously, Donabedian asserts that “the interpersonal process is the vehicle through which technical care is implemented and on which its success depends” (1988b, p. 1745). As a result this study focused on attributes of the interpersonal processes of care, recognizing that deficient interactions between a parent and a provider likely impact whether or not the provider can appropriately manage an episode of care, and whether or not the parent can operationalize information obtained during an episode of care—either of which may impact ultimate outcomes of care.

**Social learning theory: Self-efficacy in communication.** Bandura’s Social Learning Theory attempts to explain and predict behavior via the key concepts of motivation, outcome expectations, and efficacy expectations (Albert Bandura, 1977; A. Bandura, 1977; Becker, 1990). According to this theory, cognitive processes play a significant role in the acquisition and retention of new behaviors. Behavior change and maintenance of that change are functions of a person’s expectation about the outcomes that derive from employing that behavior, and the
individual’s expectations about their ability to engage in that behavior (Becker, 1990). Specifically, one’s “outcome expectations” are based upon their belief that a given behavior will result in a certain outcome. In addition, an individual’s “efficacy expectation” stems from their beliefs about the relationship between their capabilities, specific behaviors and subsequent outcomes. Consequently, it is their personal perception, not necessarily reality, which influences their behaviors (Becker, 1990).

Self-efficacy is associated with beliefs about one’s ability to perform specific behaviors in distinct situations and one’s efficacy expectation will vary depending on the task and surrounding circumstances (Bandura, 1994; Becker, 1990). Importantly, the strength of one’s belief in one’s own effectiveness is likely to affect one’s effort to cope with a given situation (A. Bandura, 1977; Bandura, 1994). According to Bandura, one’s perception of their self-efficacy influences their acquisition of new behaviors, inhibition of existing behaviors, and disinhibition of behaviors (A. Bandura, 1977; Bandura, 1994; Becker, 1990). Self-efficacy affects one’s choice of effort expenditure and duration or persistence of effort when confronted with obstacles (A. Bandura, 1977; Becker, 1990). Moreover, self-efficacy influences causal attributions and affects an individual’s emotional reactions and thought patterns (Bandura, 1994; Becker, 1990).

Efficacy expectations vary in magnitude, strength and generality (A. Bandura, 1977). Magnitude is determined by the ordering of tasks by difficulty. Thus, when tasks are so ordered, individuals with low levels of self-efficacy would feel capable of performing the easiest tasks while individuals with greater levels self-efficacy would feel capable of executing more difficult tasks (A. Bandura, 1977). Strength refers to one’s judgment regarding their ability to perform a certain task (Becker, 1990). Bandura postulates that an individual’s weak expectations of mastery are easily extinguished by “disconfirming experiences.” Conversely, individuals who
possess strong expectations will persevere in their efforts in the face of such experience (Becker, 1990). Finally, efficacy expectations differ in generality with some experiences creating limited mastery while other experiences result in a more general sense of mastery extending beyond the specific situation (A. Bandura, 1977).

There are four sources of efficacy expectations. “Performance accomplishments” refers to learning via personal mastery of an experience and is the most influential source of efficacy expectations (Becker, 1990). “Vicarious experience” constitutes learning through observation of events or other people, known as live modeling or symbolic modeling (A. Bandura, 1977). Importantly, modeled behavior with clear outcomes conveys more efficacy information than if the modeled actions are ambiguous. In addition, congruence in characteristics between the model and the observer increases the personal relevance of vicariously derived information (A. Bandura, 1977). “Verbal persuasion,” while widely used due to its ease, results in weaker efficacy expectancy because verbal suggestion does not provide an authentic experience for the individual and may be easily extinguished (A. Bandura, 1977). Lastly, one’s “emotional arousal” or physiologic state informs perceived self-efficacy. According to Bandura, high arousal debilitates performance and individuals are more likely to expect success when they are not stressed (1977).

Because the cornerstone of social learning theory is the individual’s perception of self-efficacy, the theory is readily applicable to a large variety of populations as it explains the individual’s behavior based upon that person’s on “their own terms.” Furthermore, social learning theory provides a framework to predict how an individual will behave under given certain circumstances. In particular, social learning theory offers unique insight into the behaviors of parents. The transition into parenthood propels adolescents and adults into an
expanded role of mother or father, and perhaps spouse or partner. They must manage
interdependent relationships within a family system as well as meet the ever-changing challenges
of child rearing, including management of their child’s health status (Bandura, 1994). Self-
efficacious parents are able to adjust with these demands, however, those who lack self-efficacy
are susceptible to stress and depression (Bandura, 1994).

Self-efficacy in patient-provider interactions has been implicated in health related
communication, particularly in patients with limited HL. Self-efficacy influences information
exchange, satisfaction with care, self-management and patient outcomes (Heisler, Boulknight,
Haywood, Smith, & Kerr, 2002; Sarkar, Fisher, & Schillinger, 2006). Low self-efficacy in
patient-provider interactions results in decreased satisfaction with care, diminished confidence in
providers and worse symptom distress (Maliski et al., 2004). Notably, level of HL predicted
self-efficacy within the contexts of diabetes, HIV-self care and colorectal screening (Ishikawa et
al., 2008; von Wagner, Semmler, Good, & Wardle, 2009; Wolf et al., 2007). Given the potential
impact of HL on self-efficacy, maternal self-efficacy in communicating with providers may
indeed be a pertinent attribute of process and thus, impact subsequent outcomes of pediatric
health care. Therefore, maternal self-efficacy in communication with health care providers was
examined using a validated tool and served as an attribute of process in this study.

**Interpersonal processes of care.** Interpersonal processes of care represent the social-
psychological aspects of patient-provider interaction. Mounting evidence indicates that technical
care varies by racial and ethnic group and by socioeconomic status, or by both (Kubzansky et al.,
2010), and may be attributable to differences between minorities and their counterparts in the
interpersonal exchange between patients and providers (Stewart et al., 1999). When interpersonal
processes are improved, patients gain increased knowledge, and become empowered and motivated to manage their own health (Stewart et al., 1999).

Frequently, interpersonal process has been considered a single, mostly undifferentiated construct and is often assessed with one or two summary measures such as satisfaction with care or communication (Stewart et al., 1999). A significant shortcoming of such measures that address satisfaction is that they are based solely on patients’ expectations for care as opposed to whether or not appropriate care was delivered. Substantial incongruities can exist between patient expectations for care and standards of care, particularly for specific populations. Importantly, information about what actually happened during care is necessary for understanding mechanisms by which vulnerable populations experience disparate care or outcomes (Stewart et al., 1999). Thus, Stewart and colleagues (1999) have differentiated interpersonal processes of care, as perceived by patients, into three dimensions: communication, decision-making and interpersonal style.

**Communication.** Communication includes general clarity of communication, and elicitation of, and responsiveness to patient problems, concerns and expectations. In addition, it includes contextually appropriate explanations about patient condition, progress and prognosis, as well as processes of care such as diagnosis and treatment. Finally, it addresses whether clinicians encourage patients to assume personal responsibility for their health and whether they convey the idea that what a patient does influences her health (Stewart et al., 1999).

**Decision-making.** Decision-making is viewed within the context of how a provider responds to a patient’s preference for care and whether a provider considers the patient’s ability and desire to act in accordance with clinical recommendations (Stewart et al., 1999).
**Interpersonal style.** Stewart and colleagues (1999) distinguish five elements of interpersonal style: friendliness/courteousness, respectfulness, discrimination, cultural sensitivity, and emotional support and reassurance.

Substantial research documents the associations between insurance status, race/ethnicity, and education level on health care access and quality, and considerable preliminary research indicates that patient or parent level of HL similarly impacts these health care outcomes. Less is known about how or by which processes these associations occur. This study attempted to clarify these relationships by discriminating between the dimensions of the interpersonal processes as perceived by mothers within the context of HL using a validated tool.

**Outcomes: Maternal Perception of Pediatric Ambulatory Care**

Child health outcomes can be characterized as the effect of a health intervention on a child’s health status (Seid et al., 2000). Measuring health outcomes, and thus, quality of care, for children requires a different approach than that of measurement in adults. Importantly, there are specific differences in health care delivery between children and adults. In addition, childhood is a unique period of life with unique health care needs. Differences between adults and children are frequently summarized by the “four D’s”: development, dependency, differential epidemiology and demographics (Beal et al., 2004; Mangione-Smith & McGlynn, 1998; Seid et al., 2000). As a result, any quality assessment must acknowledge the impact of these factors on child health outcomes.

**Development.** Health in childhood is marked by appropriate cognitive, emotional, social and physical development and, as such, a comprehensive view of child health status and needs is required. As children grow, health needs and utilization, as well as preventive care requirements, change. Quality assessment must emphasize primary care activities such as preventive services.
and anticipatory guidance, and measurement of a child’s functioning in multiple domains (Seid et al., 2000).

**Dependence.** Children are dependent on parents and other adults, as well as systems such as schools and social services, for obtaining and receiving care. Consequently, outcome measures should reflect an interaction between the health system and the family and the health system and other systems (Seid et al., 2000). In addition, health care providers and researchers must frequently depend on parents and caregivers to provide information regarding a child’s health outcomes and care experiences (Beal et al., 2004). Importantly, parents and caregivers are in a unique position to evaluate the care their child receives. In addition, parent report can be more accurate than medical chart review for assessing interpersonal aspects of clinical visits (Seid et al., 2003).

**Differential epidemiology.** Children, in contrast to adults, are mostly free from chronic conditions and disability. Their interactions with the health care system are concentrated on preventive care and management of acute or episodic illness (Beal et al., 2004). As a result, measuring health outcomes based on wellness presents theoretical and methodological challenges for investigators (Beal et al., 2004). It can be difficult to establish “normal” outcomes from “poor” outcomes, especially since the results of suboptimal care may not be apparent for years (Mangione-Smith & McGlynn, 1998). In addition, small numbers of children suffer from a large number of low-prevalence conditions. This further complicates quality assessment as it is difficult to obtain large enough sample sizes to obtain scientifically valid results (Mangione-Smith & McGlynn, 1998; Seid et al., 2000).

**Demographics.** Children, as a group, are disproportionately affected by poverty, lack of insurance and other indicators of vulnerability (Seid et al., 2000). Moreover, living in poverty
increases the probability of relying on publicly funded sources of health insurance, such as Medicaid or the State Children’s Health Insurance Program, and health care, such as safety-net providers and community health centers. As a consequence, changes in public policy which negatively affects the financing of these programs and services can lead to fragmentation and discontinuity of care, and significantly impact child health outcomes (Beal et al., 2004). Thus, child health outcome measures must account for variations in potential access variables.

For the above noted reasons, pediatric quality assessment experts advocate for a noncategorical approach to the measurement of the quality of pediatric health care (Kurtin, 2003; Seid et al., 2000). Specifically, the noncategorical approach implies quality measures that apply to all children regardless of health status or condition. Such measures should reflect the issues important to children and families, as well as those important to child health and to measures of care with potential long-term benefit (Homer, Kleinman, & Goldman, 1998). Noncategorical outcomes measures can include those measures such as functional status, health-related quality of life or those developed to identify consumer experiences with care (Homer et al., 1998; Seid et al., 2000).

The Institute of Medicine (IOM) defines primary care as:

“the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community” (Donaldson, Yordy, Lohr, & Vanselow, 1996, p. 31).

Although the operationalization of this definition varies, clinicians and investigators generally agree that primary care is “accessible, longitudinally continuous, adequately communicated, contextual, comprehensive and coordinated” (Seid et al., 2003). Moreover, quality pediatric primary or ambulatory care is safe, effective, efficient, child- and family-centered, timely and equitable (Institute of Medicine, 2001). As noted, parent surveys are a valid tool for use in
assessing the quality of care in children. In fact, parent surveys may be the best tool for determining whether providers have adequately communicated necessary health care information to parents (Mangione-Smith & McGlynn, 1998). In addition, it is most often the parent or caregiver who can attest to whether health care was customized, placing the needs of the child and family first, and whether they were engaged in the care of their child. In other words, whether they were “encouraged to share in decision-making responsibilities to the degree they wished to be involved” (Kurtin, 2003, p. 12).

This study sought to identify and explain the relationships among specific antecedent, structural and process factors that influence the outcome variable, maternal perception of quality of pediatric ambulatory healthcare (Figure 3). As previously discussed, these factors may also contribute to suboptimal pediatric care. Specifically, mothers with limited HL skills can experience difficulty in communicating their child’s needs, understanding medical instructions, following recommendations or performing child health care tasks, and understanding issues related to consent or risk communication, all of which may influence their perception of care received (Rothman et al., 2009). Parents play an increasingly important role in the pediatric health care team and are in a unique position to report on the care that their children receive (Sobo et al., 2006). Given the potential impact of HL on interaction communication processes as previously noted, this study used a validated tool to measure maternal perception of quality of pediatric ambulatory care in order to identify potential structural or process precursors to suboptimal outcomes and to elucidate gaps in care for the children of these caregivers.

**Conclusion**

This study attempted to identify and explain the relationships among specific antecedent, structural and process factors, as discussed throughout, that influence the outcome variable of
maternal perception of quality of pediatric healthcare. Donabedian’s structure-process-outcome model (1980), as modified by Coyle and Battles (1999), served as the unifying conceptual framework for this investigation. In addition, the antecedent, maternal health literacy, was informed by Nutbeam’s conceptualization of health literacy (2000, 2008). Bandura’s Social Learning Theory, specifically his conceptualization of self-efficacy (1977), and the conceptual framework of interpersonal processes of care by Stewart, Nápoles-Springer and Pérez-Stable (1999) further elucidated the process variables examined. Finally, maternal perception of quality of care served the outcome measure.
Figure 3-1.

Structure -> Process -> Outcomes

(Donabedian, 1980).

Figure 3-2.

Antecedents
- Environment
  - Cultural
  - Social
  - Personal
  - Physical

Structure
- Organizational Setting

Process
- Processes of Care

Outcomes
- Clinical End Points
- Quality of Life
- Mortality
- Costs

(Coyle, 2000).
Figure 3-3.
References: Chapter Three


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CHAPTER FOUR

Methods

Study Design, Population Sample and Setting

A descriptive, cross-sectional design using convenience sampling and validated survey instruments was used to examine the relationships between maternal HL, maternal self-efficacy in communication with providers, maternal perception of interpersonal interactions with health care providers, and perceived quality of ambulatory pediatric healthcare received among a low-income, Latina population.

**Population sample and inclusion criteria.** The sample size for this study was 124 participants and exceeded the targeted sample size of 118 by six participants. The target sample size was based on an *a priori* analysis based upon literature review (Field, 2009; Green, 1991; Tabachnick & Fidell, 2007), and calculations using G*Power version 3.1.0. According to Green (1991) Tabachnick and Fidell (2007), testing individual predictors within a regression model, the primary method used in this study, requires a minimum sample size of 104 + k (where k represents the number of predictors), whereas testing the overall fit of the model requires 50 + 8k at the .05 alpha level with 0.8 power and an effect size of 0.15. Based upon this recommendation and using a maximum possible number of predictors of ten used in any one hypothesis,¹ a sample size of 130 participants would be required. G*Power calculation using an effect size of 0.15 suggested 118 participants. We also anticipated using one-way independent analysis of variance (ANOVA) to assess relationships among categorical variables (of which there are three groups in each categorical variable). The medium effect size for an ANOVA can be .25 to .40 (Steinberg, 2007). We sought an effect size of .30 and 0.8 power, which according to G*Power, required

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¹ This assumes that all antecedent, structure and process variables would achieve statistical significance and be entered into analysis as covariates, a highly unlikely scenario.
sample size of 111. Therefore we determined the minimum sample for this study was 118 participants and a total of 124 participants opted to participate.

**Inclusion criteria.** Participants were 18 years or older in age, self-identified low-income, Latina English- or Spanish-speaking mothers or female primary care givers of children aged 3 to 48 months who had sought ambulatory health care for well child care or treatment of an episodic illness or acute injury in their child within the last six months in any type of primary health care setting. This study sought to assess how specific maternal or female primary caregiver antecedent and health system structural characteristics influence health care processes and outcomes generally; thus, receipt of care at a specific place or from a specific provider or type of provider was not required. Low-income socioeconomic status was defined as current receipt of public assistance in the form of WIC, TANF, or Medi-Cal or self-reported income of less than or equal to 200% the federal poverty level.

**Exclusion criteria.** Mothers or female primary care givers who did not self-identify as low-income, who were not Latina, or who did not speak English or Spanish, were excluded from this study. Further, if the mother or female primary care giver had not sought ambulatory care services for her child within the last six months or if the child was less than 3 months of age or greater than 48 months of age, the mother was similarly be excluded. In addition, because chronic illness can alter the frequency and character of healthcare that a child receives as well as maternal interaction with the healthcare system, mothers or female primary caregivers of children who had a chronic health condition, defined as a health problem that lasts over three

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2 WIC is a federally funded health and nutrition program for women, infants, and children. WIC participants must meet income guidelines and be pregnant women, new mothers, infants or children under age five. In California, 82 WIC agencies provide services locally to over 1.4 million women, infants and children each month at over 600 sites throughout the State.
3 Temporary Assistance to Needy Families, a federally funded program and successor to the Aid to Families with Dependent Children (AFDC) program
4 California's Medicaid program, a joint federal-state program that provides health insurance and long-term care coverage to low-income children, their parents, elderly, and disabled people in the state.
months, affects the child’s normal activities, and requires hospitalizations, home health care and/or extensive medical care (Cohen et al., 2011), were excluded. Finally, due to general societal or culturally defined gender differences in parenting roles and other characteristics that may influence interpersonal processes, fathers or male primary care givers were also be excluded from this study.

Setting. Participants were recruited from five WIC clinics within a single county located in the inland region of southern California. Approximately 49 percent of this county’s population identify themselves as Latino and over 35% of the region’s population has an income equal to or below 200% of the federal poverty limit (California Healthcare Foundation, 2009). As a result, we believe we recruited a convenience sample that adequately represented the population of interest and which provided the breadth of information needed to examine the relationships among the variables as previously described.

Procedure

Approval for the study was obtained from the institutional review board of the University of California, Los Angeles. Upon approval, study participants were recruited using flyers printed in English and in Spanish that were distributed in the waiting areas of the five WIC clinics. The flyers provided a description of the study aims and procedures and listed the dates and times that participant recruitment would take place. In an effort to encourage participation, the flyers emphasized that information obtained from the study could be used to improve the quality of pediatric health care. In addition, WIC clinic staff members were educated to the purpose of study and their support was solicited. Initially, two to three date/time combinations, depending on specific clinic location, were listed for each separate site and coincided with clinic or classroom activities to increase respondent participation. Participants were low-income mothers
with young children who would likely find participation in a research study difficult due to transportation or other issues if it required separate or additional meetings at the clinic or classroom. Thus, coincidental scheduling was done in an attempt to increase participation and convenience. Moreover, additional dates/times were added at two sites to obtain required sample size. Although specific appointments to participate were offered if needed, no participants scheduled an appointment but instead participated in the study following their regularly scheduled WIC appointment. Finally, the flyers provided the contact information of the principal investigator (PI) for English speakers and the contact information of a bilingual, bicultural research assistant (RA) for Spanish speakers, to request additional information.

On the days when subject recruitment, enrollment and participation occurred, the PI and/or RA provided each mother or female primary caregiver with a brief description of the study, answered any questions and determined participant eligibility. If a participant was eligible and remained interested, the PI or RA read and discussed the informed consent with the participant in her preferred language, English or Spanish, informed her of her rights as a human subject, asked if she had further questions, and then sought her consent and signature on the approved consent form if she was still in agreement (Appendix 1). The participant was given a copy of the consent form for her records. Following the completion of informed consent, the PI or RA administered a health literacy (HL) assessment screen in a private cubicle or room, depending on clinic site, and asked the participant to complete a series of questionnaires described below. Each participant was given the option having the PI or RA read the questionnaires aloud to her to ensure that reading ability did not prevent those mothers with poor reading skills from participating and to eliminate any potential participant embarrassment over limited literacy skills. Only two participants requested such assistance. Each participant was
assigned a unique identification number and all identifying information was immediately
disassociated from completed questionnaires. The time required for participation ranged from 25
to 45 minutes. Participants received a $20 incentive in the form of a gift card to a nationally
known store at the completion of the interview.

Instruments

**Demographic information.** Demographic information regarding each maternal or
female primary caregiver and family/child was collected. Questions included queries such as
maternal/caregiver education level and language use, family living arrangements, presence of
support, number of children and adults in home, child health insurance status, whether the child
receives care from a regular place and regular provider and whether the mother/female caregiver
is confident completing medical forms (see discussion below, *Single Item Literacy Screener*)
(Appendix 2).

**Health literacy: The “Newest Vital Sign.”** In this study, we assessed maternal HL
using the *Newest Vital Sign* (NVS). The NVS is one of several recently developed tools now
available for the screening and assessment of HL. Briefly, the NVS is based upon a nutrition
label from an ice-cream container and asks six questions that assess an individual’s prose
literacy, numeracy and document literacy, each a distinct component of HL and necessary for
interacting with today’s health care system. Importantly, the nutrition label is a familiar item.
Each correct answer is given one point. Respondents with more than four correct responses are
unlikely to have low HL, while fewer than four correct answers indicate the possibility of low
HL. In fact, zero to one correct answer indicates a high likelihood of low HL. The tool can be
administered within three minutes and is available in English (NVS-E) and Spanish (NVS-S)
(Weiss et al., 2005).
The NVS was developed from a series of scenarios which were devised by a panel of HL experts based on the concepts and types of scenarios used in HL research and general literacy assessments (Weiss et al., 2005). The Spanish version was developed by translation and back-translation of the English version (Weiss et al., 2005). The NVS was validated in a population of 250 English- and 250 Spanish-speaking participants aged 18 years and older using the Test of Functional Health Literacy in Adults (TOFHLA) as the reference standard. The investigators reported good internal consistency of the NVS-E (Cronbach $\alpha = 0.76$) and criterion validity ($r = 0.59$, $P < .001$). In addition, the receiver operating characteristic (ROC) curve for the NVS-E showed that a score of less than 2 had a sensitivity of 72% and specificity of 87% for predicting low HL, while a score of less than 4 has a sensitivity of 100% and specificity of 64% (Weiss et al., 2005). Similarly, the NVS-S also demonstrated good internal consistency (Cronbach $\alpha = 0.69$) and criterion validity ($r = 0.49$, $P < .001$). Moreover, the ROC curve for the NVS-S showed that scoring less than 2 had a sensitivity of 77% and specificity of 57% for predicting limited HL, while a score of less than 4 had a sensitivity of 100% and specificity of 19% (Weiss et al., 2005). The specificity of the NVS may result in overestimating the percentage of patients with low HL. In addition, while adequate for screening, the psychometric properties of the NVS-S were not as good as those for the NVS-E (Weiss et al., 2005). Most importantly, the NVS has been used successfully in populations similar to the present study population (Hassan & Heptulla, 2010; Wood, Price, Dake, Telljohann, & Khuder, 2009; Yin et al., 2011).

**Health literacy: Single Item Literacy Screener.** A secondary assessment of maternal HL was conducted using a single item literacy screener included in the demographic questionnaire. The single item self-reported screening question, in English or Spanish, “How confident are you filling out medical forms by yourself?” with possible responses ranging from
“1” (never) to “5” (always), has been found to be quite effective in detecting inadequate health literacy among diverse populations using the TOFHLA, S-TOFHLA (a shortened version of the TOFHLA) or the Rapid Estimate of Adult Literacy in Medicine (REALM) as reference standards (Chew, Griffin, Partin, Noorbaloochi, Grill, Snyder, Bradely, et al., 2008; Cordasco, Idalid, Homeier, & Sarkisian, 2010; Morris, MacLean, Chew, & Littenberg, 2006). Answering “2” or less to this question indicates that respondent is at risk for low HL and likely needs assistance regarding health-related information.

When comparing three single item screening questions to standards based on the S-TOFHLA among 1796 veterans receiving care at four different sites, Chew and team (2008) found that the area under the receiver operating characteristic curve (AUROC) for the questions for detecting inadequate HL ranged from 0.66 to 0.74, with “confident with forms” performing better than all other questions ($p < 0.05$). Moreover, when using REALM as the comparison standard of inadequate HL, the AUROC for the screening questions ranged from 0.72 to 0.84, with “confident with forms” again performing significantly better than the other 2 questions ($p < 0.05$). When all combinations of the 3 screening questions were considered, the authors found that no combination of these questions significantly increased the AUROC in detecting inadequate HL or the combination of “inadequate or marginal” HL defined by either the S-TOFHLA or the REALM above the AUROC for the most effective single question, “confident with forms” (Chew, Griffin, Partin, Noorbaloochi, Grill, Snyder, Bradely, et al., 2008).

Similarly, Sarkar and colleagues (2011) recently reported that a single question about “confidence with forms” or a summative scale of the three above noted questions can

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5 The three single item literacy screener (SILS) questions were: “How often do you have someone (like a family member, friend, hospital/clinic worker or caregiver) help you read hospital materials?”; “How often do you have problems learning about your medical condition because of difficulty understanding written information?”; and “How confident are you filling out forms by yourself?” (Confident with forms) (Chew, Griffin, Partin, Noorbaloochi, Grill, Snyder, Bradley, et al., 2008).
discriminate between those with adequate HL and those with inadequate or inadequate plus marginal HL in 296 participants, 48% of whom were Spanish-speaking. The “confidence with forms” question again performed best for detecting inadequate (C-index = 0.82, [0.77-0.87]) and inadequate plus marginal HL (C-index = 0.81, [0.76-0.86]; p < 0.01 for differences from other questions), and performed comparably to the summative scale. The “confident with forms” question and summative scale also performed well across language, race/ethnicity, educational attainment, and age (Sarkar et al., 2011). These findings are also supported by Cordasco and colleagues (2010) who also reported that “confident with forms” had the highest sensitivity of the three SILS questions among 147 geriatric monolingual Spanish-speaking patients when compared against the S-TOFHLA.

Because the single question, “How confident are you filling out forms by yourself?” demonstrates adequate sensitivity for identifying respondents at risk of low HL when compared against both the TOFHLA, S-TOFHLA and the REALM, the question was included on the demographic form so as to provide an additional mechanism by which to assess maternal HL in this population.

Significantly, no one “gold standard” exists for screening or measuring HL. Although the two most widely used tools are the TOFHLA or its abbreviated version, S-TOFHLA, and the REALM or its shortened version, REALM-SF, these commonly used tools have significant drawbacks for use in this study with this specific population. For example, although the TOFHLA is available in both English and Spanish, administration time for the full version is 18 to 22 minutes and seven to ten minutes for the short version which would substantially increase subject burden under these circumstances (Nielsen-Bohlman, Panzer, & Kindig, 2004). In addition, while the REALM-SF can be administered in approximately three minutes, it does not
measure numeracy and is not available in Spanish (Baker, Williams, Parker, Gazmararian, & Nurss, 1999). In fact, English word recognition and pronunciation tests such as the REALM or REALM-SF may not be appropriate tools to use in populations who speak a language other than, or in addition to, English (Arozullah et al., 2007). Moreover, the TOFHLA or REALM and their abbreviated versions may not be contextually appropriate for assessing HL in low-income Latina mothers/female caregivers in southern California. For example, the REALM, REALM-SF, TOFHLA and s-TOFHLA include words such as “gallbladder,” “emphysema,” and “osteoporosis,” each of which is likely to be unfamiliar to a low-income mother of a young child, regardless of literacy level and thus confound identification of a true risk of low HL. Finally, neither tool appears to have been adequately validated in low-income Latina mothers who may be markedly different from those populations in which the tools were originally tested (e.g., the mothers here may be younger, less educated, foreign born or native Spanish speakers). As a result, for this study maternal HL was assessed using the Newest Vital Sign (NVS) and a single item literacy screener (SILS).

**Social Support.** This study was also concerned with elucidating those social support factors that influence the quality of ambulatory care received by Latino children within the context of maternal HL. Social support however, is a complex, multifaceted concept that is defined and measured differently by various researchers. As noted previously, access to other adult support may mitigate potentially negative consequences of low maternal HL. Thus, we examined social support using the Family Support Scale (FSS) (Dunst, Jenkins, & Trivette, 1984), an 19 item scale, available in both English and Spanish, that reflects various sources of support from individuals and groups to families rearing a young child and measures the helpfulness of each on a 5-point scale ranging from “not at all helpful” (1) to “extremely helpful”
The scale is organized into five empirically derived factors: kinship, spouse/partner support, social organizations, informal support and professional services. A mean score for each of two subscales, formal and informal support, and a total support score, is derived from the 19 answers. The instrument demonstrates good reliability, internal consistency and test-retest reliability (Cronbach's $\alpha = .77$ split-half reliability $= .75$, and test-retest reliability $= .41$ to $.75$ across subscales) (Dunst et al., 1984). The FSS has been used successfully in several studies and with English- and Spanish-speaking Latino, and low-income populations (Bailey et al., 1999; Hanley, Tasse, Aman, & Pace, 1998).

**Self-Efficacy.** Maternal self-efficacy in communication with providers was measured using the *Perceived Efficacy in Patient-Physician Interactions* (PEPPI), a ten item test reported as a mean score that measures the subjective sense of patients’ confidence when meeting with their physicians and which is available in English and Spanish (Maly, Frank, Marshall, DiMatteo, & Reuben, 1998). A shortened five-item version of the instrument is also available. The shortened version performs nearly as well as the longer version, however, the instrument’s authors recommend using the ten-item scale when precision is needed for clinical application (Maly et al., 1998). As a result, because we were interested in the impact of self-efficacy on clinical interaction, this study used the ten-item version.

Specifically, the ten Likert-style questions assess a “patient’s confidence in their ability to elicit and understand information from and communicate information to their physicians, as well as confidence in their ability to get physicians to address and act on their main medical concerns” (Maly et al., 1998, p. 889). Each item begins with “How confident are you in your ability to…” with participants responding to each question on a scale from 1 (“not at all confident”) to 5 (“very confident”). A mean score is derived from the ten answers. The PEPPI,
originally developed and validated for use with community dwelling geriatric populations, demonstrates good internal reliability (Cronbach’s $\alpha = .90$ to .91) (Maly et al., 1998). In addition, in the validation study, factor analysis of the tool using principal components analysis with varimax rotation confirmed the presence of one distinct domain and the tool exhibited convergent and discriminant construct validity in that it correlated negatively with avoidant coping style and positively with active coping style. Further, the PEPPI also demonstrated significant positive correlations with the “interpersonal,” “communication,” “general satisfaction,” and “time spent” subscales of the Patient Satisfaction Questionnaire$^6$ (Maly et al., 1998).

The PEPPI has been used to examine parental concern about medical errors during a child’s hospitalization and the association between this concern and parental self-efficacy with physician interactions among an English- and Spanish-speaking population in the northwestern United States (Tarini, Lozano, & Christakis, 2009). It has also been used successfully with lower socioeconomic populations (Maliski et al., 2004; Maly et al., 1998). In addition, many of the sociocultural factors which may influence patient-provider interactions among older persons can also influence interactions between providers and low-income patients (Maly et al., 1998). These factors, as well as the instrument’s strong psychometric profile, rendered the tool appropriate for use here.

As noted, this study examined the relationships between specific maternal characteristics and perceived quality of ambulatory pediatric care received. Thus, respondents were instructed to answer the questionnaire as it applied to their health care interactions regarding the care of their child as opposed to interactions seeking health care for themselves. Also of note, the PEPPI

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$^6$ (Marshall, Hays, Sherbourne, & Wells, 1993)
addresses patient-physician interaction. This study did not specify type of health care provider given that many low income pediatric patients are often also seen by nurse practitioners (NP) and physician assistants (PA) depending on practice site (Lynch, Cope, & Murphy-Ende, 2001). Importantly, latent differences between physician and NP or PA communication techniques may confound the maternal efficacy construct. If a mother or female caregiver perceives greater efficacy when “talking to a nurse”, this may artificially raise her efficacy level and increase risk of type II error (Tabachnick & Fidell, 2007). This was addressed by asking the respondent to provide answers based upon her overall experience in the health care system by using the term “health care provider” in place of “doctor.” Fortunately, the authors also specifically note that the wording of the PEPPI focuses on a respondent’s own sense of self-confidence interacting with a provider in general and is not provider- nor encounter-specific (Maly et al., 1998).

**Interpersonal interactions.** Maternal perception of interpersonal interactions with health care providers was assessed using the *Interpersonal Processes of Care in Diverse Populations* (IPC) survey (Stewart, Napoles-Springer, & Perez-Stable, 1999). The IPC is a comprehensive self-report survey based upon a specific conceptual framework of interpersonal processes, that while designed for all segments of the population, incorporates specific issues of import to minority and low income groups (Stewart et al., 1999). The survey is available in English and Spanish, and as an 18-item short survey or 29-item long survey. Significantly, the IPC does not measure a single, undifferentiated construct, but rather, distinguishes three dimensions, each with multiple domains: communication, decision making, and interpersonal style (Stewart et al., 1999). Questions ask participants about their experiences in talking with their provider and generally begin with “How often did doctors” …” with possible responses.

7 As with the PEPPI as noted above, the term “health care provider” will be substituted for the term “doctor” in study tools.
ranging from “1” (never) to “5” (always). Mean scores are calculated for each of the subscales. As a result, the tool allows for assessment of distinct, albeit interrelated, aspects of the interpersonal processes of care.

The survey item pool was developed from literature on quality of care, patient-physician communication, patient satisfaction, physician-patient relationships, and unpublished surveys (Stewart et al., 1999). Spanish and English versions were developed simultaneously to ensure that the versions were as similar as possible. For example, English words were changed as needed to allow for selection of the best Spanish word. In addition, standard methods of translation and back translation were used with iterative pretesting and revision (Stewart et al., 1999).

The long survey was initially tested in a sample of 603 ethnically diverse, primarily low-income patients, aged 21 to 87 years, at a public sector primary care facility. Thirty-nine percent of respondents were Latino, 33 percent African American and 28 percent White. The survey demonstrated good internal consistency reliability with coefficients ranging from 0.64 to 0.93 (only one of the 13 IPC scales was less than .70). Moreover, the correlation between each of thirteen scales within the three dimensions of the IPC indicated sufficient independence to consider them unique constructs (Stewart et al., 1999). The authors subsequently validated the tool in 1664 diverse patients stratified by race/ethnicity and language using multi-trait scaling and confirmatory factor analysis. At this time, the authors also tested an 18-item short form in addition to the 29-item long form. Internal consistency reliability for both tools ranged from 0.65 to 0.90, with only one scale less than 0.70. To minimize subject burden, we used the 18-item short form for this study.
The IPC short form consists of a communication scale (lack of clarity, elicited concerns/responded, and explained results), a patient-centered decision-making scale (decided together), and an interpersonal style scale (compassionate/respectful, discriminated due to race/ethnicity, and disrespectful office staff). As indicated above, possible scores for each scale range from 1 to 5. A higher score indicates reports of more experiences of the labeled process, which means that in some cases higher scores indicate better processes and in other cases, higher scores indicate worse processes (Nápoles, Gregorich, Santoyo-Olsson, O'Brien, & Stewart, 2009). A relatively new tool, the IPC has been used successfully with low income, uninsured populations in several different settings (Schillinger, Handley, Wang, & Hammer, 2009; Swenson, Rose, Vittinghoff, Stewart, & Schillinger, 2008).

**Quality of care.** Maternal perception of pediatric ambulatory care received was measured using a reduced item version of the *Promoting Health Development Survey* (PHDS) (Bethell, Peck, & Schor, 2001). The PHDS is a parent survey developed by the Child and Adolescent Health Measurement Initiative (CAHMI), available in English and Spanish, that assesses whether young children aged 3 to 48 months of age receive nationally recommended preventive and development services (The Child and Adolescent Health Measurement Initiative, 2011). Preventive care guidelines for children include parent education and counseling, developmental assessment, and screening for psychosocial and safety risks (Hagan, Shaw, & Duncan, 2008). The PHDS examines whether health care providers provide such care and the degree to which they provide follow-up for children who may be at risk for developmental problems (Bethell et al., 2001). Importantly, the PHDS is not a satisfaction survey, rather, the primary purpose of the PHDS is to assess whether clinically recommended age-specific preventive and development services were provided within the context of the health care
encounter (The Child and Adolescent Health Measurement Initiative, 2011). The PHDS was specifically designed to measure the communication-dependent aspects of care that are not adequately represented by medical chart review or claims and billing data and for which the parent is the most valid and reliable source of information. Moreover, PHDS not only assesses whether recommended care was provided but the degree to which the parent has their informational needs met and whether the care provided is family-centered (The Child and Adolescent Health Measurement Initiative, 2011). The PHDS is a widely used measure. To date, over 45,000 surveys have been collected by ten Medicaid agencies, four health plans, 38 pediatric practices and nationally through the National Survey of Early Childhood Health. In addition, components of the PHDS have been included in the National Survey of Children’s Health. Moreover, the PHDS has been endorsed by the National Quality Forum as a valid measure for system, plan and provider-level assessment of parent’s experiences with pediatric preventive and developmental health care. Finally, the Child and Adolescent Health Measurement Initiative (CAHMI) has collected over 40,000 cases of PHDS data allowing for the creation of a national benchmark data set (The Child and Adolescent Health Measurement Initiative, 2011).

The PHDS was developed and tested following a rigorous six-stage process punctuated by peer-review, use of focus groups and field-testing (Bethell et al., 2001; The Child and Adolescent Health Measurement Initiative, 2011). Special attention was paid to the reading grade level of the PHDS. Formal readability assessments using computer programs placed the reading grade level at the 8th to 9th grade level. However, in-depth cognitive testing, conducted with families representing a range of racial, income and education levels, as well as different types of health insurance coverage, age of child, age and sex of parent, and number of children in
family, revealed that parents were uniformly able to complete the survey in 10 to 15 minutes confirming readability of the survey (The Child and Adolescent Health Measurement Initiative, 2011).

The PHDS was initially validated in a sample of 580 parents, 66.5% of whom were commercially insured, and to whom the survey was administered via mail. Factor analysis demonstrated a strong factor structure within the PHDS with average factor loading ranging from 0.49 to 0.83 that supported the construction of six scales. The tool was also internally consistent with Cronbach’s alpha ranging from 0.63 to 0.88 for the six scales (Bethell et al., 2001).

The PHDS is available for use in a 61-item, matrix-style full-length version, several variations of a matrix-style reduced item PHDS (commonly referred to as the Pro-PHDS) and a version for telephone administration (PHDS-PLUS). Scoring of each version may be adapted based on the needs of those conducting the survey, e.g., quality improvement or research. The initial reduced item PHDS was designed for practice or provider-level assessment of care and can be administered in approximately five minutes. The survey collects descriptive information about parenting behaviors, family issues, and information about anticipatory guidance and parental education, family-centered care, whether parental concerns are addressed, follow-up provided to children at risk for developmental delays and assessment of the family (resulting the creation of five subscales). The item-reduction process was informed by parent and provider focus groups, a review of national surveys focused on preventive and developmental care for young children and a review of key national health objectives (The Child and Adolescent Health Measurement Initiative, 2011). Unfortunately, only the full length PHDS and the PHDS-PLUS are available in both English and Spanish. Thus, after consulting with CAHMI and in an effort to reduce respondent burden, this study used a version of the reduced item PHDS previously
used with Medicaid participants in the state of Washington to measure maternal perception of quality of pediatric ambulatory care received (Child and Adolescent Health Measurement Initiative, 2000). This version of the PHDS allowed for the assessment of four subscales: anticipatory guidance and parental education, family centered care, helpfulness of information and effect on confidence, and assessment of family psychosocial well-being.

As noted, the PHDS has been widely used by Medicaid agencies, health plans, pediatric practices and at the national level to assess the quality of pediatric ambulatory care. In addition to the validation study (Bethell et al., 2001), the PHDS has also been utilized in clinical research settings. For example, Rosenthal and colleagues (2007) used the PHDS to assess quality of pediatric care received by low income children. Specifically, 157 caregivers, 55% African American, 69% Medicaid recipients, and 85% high school graduates were assessed for level of HL using the REALM and for quality of ambulatory child health care received using 5 subscales from the PHDS. Interestingly, those with lower levels of HL reported higher quality parent-provider relationships (Rosenthal et al., 2007). A second study utilized the PHDS to assess the associations of parent-primary care provider language concordance and providers’ self-rated cultural competency with parent report of quality of well child care among 462 Latino parents (Boudreau et al., 2010). Language concordance was not associated with parental reports of quality of care suggesting that provider characteristics other than language spoken may impact quality of care.

**Analysis**

Data analysis was conducted using SPSS 19.0 Statistical Package (SPSS, Inc., an IBM Company, 2010). Data was entered, inspected and cleaned per general statistical principles (Tabachnick & Fidell, 2007). Specifically, data was examined via SPSS for accuracy of data
entry, and missing data. Given the above-stated process for data collection, there was little missing data. However, in the case of missing data, we deferred to the SPSS default procedure and excluded cases listwise, thus, excluding affected case(s) from analysis for the pertinent variable(s) as applicable (Field, 2009). Outliers were not dropped but treated as extreme values for the given variable (Field, 2009).

Continuous variables included both measures of maternal HL (NVS and SILS), social support (FSS), maternal self-efficacy (PEPPI), maternal perception of interpersonal interactions (IPC), maternal perception of quality of pediatric ambulatory care (PHDS) and maternal years of education. We acknowledge that the SILS, FSS, PEPPI, IPC and PHDS scores are obtained using Likert-type 5-point scales with responses that may not necessarily be treated as equal points along a continuum. However, Likert scales are often interpreted as continuous data if the underlying concept measured is continuous and there is some indication in the tool itself that intervals between points are approximately equal such as the use of a numerical scale as is the case with each of these tools (Grace-Martin, 2008; Tabachnick & Fidell, 2007). Categorical variables include primary maternal language used, child insurance status, and regular source of care as measured by regular place of care and regular provider of care.

**Specific Aim 1.** Specific Aim 1 sought to describe levels of maternal health literacy, maternal perception of interpersonal interactions with providers, maternal self-efficacy for communicating with health care providers, and perceived quality of well-child care using standardized instruments among a group of low-income, Latina mothers obtaining primary ambulatory care for young children in the inland region of southern California. Thus, to meet this aim, we conducted descriptive analyses of all variables, including frequency distribution, measures of central tendency, range, standard deviations, and standard errors. At this time, we
also assessed the data for non-zero variance among the predictors, the presence of multicollinearity, homoscedasticity, normal distribution of errors, independence and linearity. We did not find it necessary to transform data, and as noted above, we did not exclude outliers.

**Specific Aim 2.** To answer Specific Aim 2, we analyzed associations between maternal HL, the additional antecedents of maternal education level, maternal social support, primary maternal language, and the health system structure factors of child insurance status and regular source of care. We hypothesized that maternal HL would be significantly associated with maternal level of education, maternal social support, and primary maternal language used, as well as the structure factors of child insurance status and access to regular source of care as measured by consistent place of care and consistent provider of care.

We used the Pearson product-moment correlation coefficient \((r)\) with a two-tailed probability test with a standard .05 level of significance and bivariate regression to determine correlations and the substantive size of the relationships between maternal HL and normally distributed continuous variables. One-way independent Analysis of Variance (ANOVA) was used to test for significant differences between means for maternal HL and the categorical variables.

**Specific Aim 3.** Specific Aim 3 required analysis of associations between the independent variable, maternal HL, and each of the dependent variables, maternal self-efficacy for communicating with health care providers, maternal perception of interpersonal interactions with providers and maternal perception of quality of primary pediatric ambulatory care received, by subscale respectively, while controlling for statistically significant antecedent and structure factors. Specifically, we hypothesized that maternal HL would be significantly associated with each of these dependent variables when accounting for antecedent demographic characteristics.
and structure covariates that were identified as statistically significant in prior analysis. We used standard multiple regression analysis to determine the correlation and substantive size of the relationships between maternal HL and each of the subscale outcome variables. Predictor variables that achieved bivariate significance of .10 in prior analysis (Specific Aim 2) or that were theoretically important were entered into the regression model as covariates. Statistically significant categorical covariates were recoded as needed as dummy variables to facilitate regression analysis.

At this point, we used standard forced entry regression method in which all previously significant predictors were forced into the model simultaneously. Forced entry regression was the preferred method for addressing Specific Aim 3. As discussed in Chapter 2, little evidence exists which explains the mechanism by which maternal HL influences pediatric care outcomes. The purpose of Specific Aim 3 was to clarify relationships between maternal HL and other maternal characteristics that may impact pediatric care. As a result, hierarchal regression, which requires that predictors be selected and entered into the model in an order based on prior research, was not appropriate at this point (Field, 2009). Stepwise regression requires a large sample size, as much as a 40 to 1 case to independent variable ratio, and a second sample for cross-validation to test the generalizability of the solution (Tabachnick & Fidell, 2007). Moreover, stepwise regression is based on purely mathematical criterion and risks eliminating theoretically important independent variables from the model if not highly significant, particularly with a forward method, thus increasing the risk of making a Type II error (Field, 2009). We sought to detect any prediction power of any the entered variables. Finally, the standard regression method is an acceptable method for theory testing (Field, 2009), the focus of this study.
Specific Aim 4. To address Specific Aim 4, we analyzed associations between self-efficacy for communicating with health care providers and maternal perception of interpersonal interactions with providers, and maternal perception of quality of primary pediatric ambulatory care received, respectively. We attempted to create a parsimonious statistical model that best explained the relationships and predictive qualities of the independent variables of maternal self-efficacy for communicating with providers and maternal perception of interpersonal interactions with providers, any statistically significant covariates such as maternal HL, additional antecedents and structure covariates, and the outcome variables, maternal perception of quality of pediatric ambulatory care received by subscale. Specifically, we hypothesized that maternal self-efficacy for communicating with health care providers and maternal perception of interpersonal interactions with providers will each exert a statistically significant influence on the outcome variable of quality of care received and that together, the two variables will account for a substantial percentage of variance regarding each outcome variable.

As with Specific Aim 3, we began with standard forced entry regression method in which all predictors are forced into the model simultaneously. Based upon the outcome of the standard regression, we then utilized a hierarchal regression to determine predictors of maternal perception of quality of pediatric ambulatory care received. The order of entry of variables was determined according to theoretical considerations and the results of prior statistical analysis. Specifically, the independent variables of interest for this aim, self-efficacy for communicating with health care providers and maternal perception of interpersonal interactions with providers were given high priority of entry. The covariate of maternal HL was also given significant priority followed by other important antecedent and structure factors. Criteria for entry and removal of variables was set at $p \leq .05$ and $p \geq .10$. 
Arozullah, A. M., Yarnold, P. R., Bennett, C. L., Soltysik, R. C., Wolf, M. S., Ferreira, R. M., . . .


   Development of a brief test to measure functional health literacy. Patient Education & Counseling, 38, 33-42.


CHAPTER FIVE

Results

This chapter presents the results of this dissertation. The chapter is comprised of three manuscripts, two of which report the results for the specific aims of this study. A third manuscript expands upon the literature review provided in Chapter Two by further exploring the evidence associated with health literacy and parent-provider communication.

Manuscript 1

Parent-Provider Communication within the Context of Limited Health Literacy: A Literature Review

Abstract

Objective. This paper reviews the evidence examining parent-provider communication within the context of parental HL.

Methods. The databases MEDLINE, CINAHL and PsycInfo were searched for English-language articles published from 1996 to 2011 using the following search terms, “health literacy,” “literacy,” and “parent,” and “communication” in combination with the medical subject headings (MeSH) “physician-patient relations.” Only three papers were identified that specifically assessed parental HL and provider communication while eight papers described provider perception of parental HL.

Results. Collectively, these studies reveal that HCPs lack sufficient knowledge and understanding of HL and as a result, fail to act or act inappropriately in response to a patient with low HL. Moreover, the majority of HCPs have not incorporated specific
evidence-based “best practices” into their routine care of patients and families. Notably, institutional factors also influence how HCPs respond to HL issues.

**Conclusions.** Clear communication between a parent and their provider is a key determinant of their child’s health. Although the mechanisms remain unclear, evidence indicates that HL plays some role in whether health care encounters are beneficial and productive. Additional research is necessary to better illuminate those factors that help or hinder information exchange between a HCP and a parent or caregiver with or at risk for limited HL. Clinicians must institute practical strategies as outlined above to reduce the burden of low HL in face-to-face encounters with patients and families.

**Introduction**

Health literacy (HL) is frequently defined as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (Nielsen-Bohlman, Panzer, & Kindig, 2004, p. 4). Importantly, HL encompasses complex reading, listening, and speaking skills as well as analytic, quantitative and decision-making skills, and the ability to use these skills in health related situations (Nielsen-Bohlman et al., 2004). Only 12 percent of U.S. adults are estimated to possess proficient health literacy. In fact, more than one third of this population, nearly 77 million persons, can be categorized as possessing basic or below basic health literacy (Kirsch, Jungeblut, Jenkins, & Kolstad, 2002). Moreover, although recent nationally representative, population-based studies of HL do not exist, a pooled analysis of 85 studies, including data on 31,129 subjects, revealed the weighted prevalence of low and marginal HL among study participants to be 46% (Paasche-Orlow, Parker, Gazmararian, Nielsen-Bohlman, & Rudd, 2005).
Individuals with limited HL use fewer preventive services, experience delay in diagnosis, and have difficulty understanding their medical condition (Gazmararian, Williams, Peel, & Baker, 2003; Williams, Baker, Parker, & Nurss, 1998). In addition, low HL has been associated with poor adherence to medical instructions, inadequate self-management skills, reduced health status and increased risk of mortality in adult populations (Baker et al., 2007; D. A. DeWalt, Berkman, Sheridan, Lohr, & Pignone, 2004). Significantly, low HL is strongly associated with low educational attainment, low income, race, ethnicity, age, and limited English-speaking ability (Kutner, Greenberg, Jin, & Paulsen, 2006; Paasche-Orlow et al., 2005).

Further evidence suggests that persons with poor HL/literacy may incur higher medical costs (California Health Interview Survey, 2009) and use an inefficient combination of services than their more literate counterparts (Howard, Gazmararian, & Parker, 2005). Vernon and colleagues (2007) estimated the total costs of low HL to the U.S. economy as being between $106 and $238 billion per year. Accordingly, three federal initiatives, the Patient Protection and Affordable Care Act of 2010, the National Action Plan to Improve Health Literacy, and the Plain Writing Act of 2010, emphasize action on HL (Grant & Kurosky, 2008). Moreover, Healthy People 2020 calls for “closing the gap in health literacy” as a means of reducing health disparities (Office of Disease Prevention and Health Promotion, 2000).

In 2010, 92.1 percent of children under 18 years of age had contact with a health care provider during the preceding 12 months (Bloom, Cohen, & Freeman, 2011). Further, over 18 percent of all emergency department visits, over 23 million visits, per year are for illness or injury in children less than 15 years of age (Centers for Disease
Thus, parents interact in substantial numbers with health care providers and the health care system regarding the health, development and well-being of their children. Yet, despite an expanding body of literature on HL, few studies have assessed the relationship between parental, caregiver or child HL and pediatric health or developmental outcomes. Importantly, child health outcomes not only depend on a parent’s ability to read health information but also upon their abilities to extract, communicate, analyze and use health information to participate in their child’s care (Ishikawa, Takeuchi, & Yano, 2008). Recent evidence however, indicates that a large number of U.S. parents possess limited HL skills and that low parental HL impedes appropriate parental understanding of treatment regimens (Sleath et al., 2006; Yin, Dreyer, Foltin, Van Schaick, & Mendelsohn, 2007). In fact, nearly half of all parents were unable to perform 1 of 2 medication-related tasks and 59% reported difficulty understanding over-the-counter medication labels (Yin et al., 2009). Further, two thirds were unable to calculate the annual cost of health insurance based on family size, and nearly 70% were unable to enter names and dates correctly on health insurance forms (Yin et al., 2009).

In addition, children with asthma who had parents with low literacy had a greater incidence of emergency department visits, hospitalizations, and greater use of “rescue” medications as well as increased days missed from school, even after adjusting for asthma-related parental knowledge, disease severity, child medication use, and other socio-demographic factors (D. A. DeWalt, Dilling, Rosenthal, & Pignone, 2007). Further, parents with limited HL worried more and perceived greater overall burden from their child’s asthma even when reported use of health services was controlled (Shone,
Conn, Sanders, & Halterman, 2009). Finally, maternal and child reading test scores were the strongest independent determinants of glycemic control in children with type I diabetes (Ross, Frier, Kelnar, & Deary, 2001). Importantly, additional evidence indicates that parents with less than a high school education had eight times the odds of being categorized as low health literate (Yin et al., 2009).

In contrast to these findings, while parental HL scores correlated with parental perception of severity of child illness, they did not correlate with use of preventive services, comprehension of diagnosis, medication name and instructions, or ability to obtain and administer prescribed medications among parents seeking care for their children in a urban public hospital (Moon, Cheng, Patel, Baumhaft, & Scheidt, 1998). Low health literate caregivers were twice as likely to report high adherence to a daily multi-vitamin with iron regimen in infants as caregivers with adequate HL in adjusted analysis (Hironaka, Paasche-Orlow, Young, Bauchner, & Geltman, 2009). Further, no differences in health care use or cost between children of caregivers with low HL and children of caregivers with adequate HL existed among an inner-city, ethnic minority population (Sanders, Thompson, & Wilkinson, 2007).

Nonetheless, low parental HL may impede both verbal and written communication and interfere with the development of high-quality parent-provider relationships resulting in suboptimal pediatric health care. As a result, limited parental HL may substantially disrupt access to pediatric health care, impede informed parent decision-making, and exacerbate pediatric health disparities (Yin et al., 2009).

Therefore, the purpose of this paper is to review the evidence examining parent-provider communication within the context of parental HL. The databases MEDLINE,
CINAHL and PsycInfo were searched for English-language articles published from 1996 to 2011 using the following search terms, “health literacy,” “literacy,” and “parent,” and “communication” in combination with the medical subject headings (MeSH) “physician-patient relations.” These search strategies combined yielded 116 different publications. Of these, 16 dealt specifically with parental HL and parent-provider communication. Only three papers were identified that specifically assessed parental HL and provider communication while eight papers described provider perception of parental HL. These papers form the basis of this review.

**Communication and Health Literacy**

Communication can be broadly defined as “the exchange of information for some purpose(s)” (Institute of Medicine, 2001). Within the health care setting, an exchange of information is needed in order to determine the reason for the patient-provider contact and the nature of the problem, to guide formulation of an action plan and assess its feasibility, and to clarify the responsibilities of the parties involved (Institute of Medicine, 2001). Thus, an encounter’s outcome depends largely on the effectiveness and quality of the information exchange.

An extensive body of literature documents the link between interpersonal communication and health outcomes (Clark, 2002). The patient-provider interaction influences accuracy of diagnoses, understanding of problems, likelihood of adherence to treatment and recovery processes (J. B. Brown, Stewart, & Ryan, 2003). Significantly, to effectively participate in health consultations, patients must be able to verbally express their needs, concerns, health beliefs and expectations for care (Schlickau & Wilson,
Moreover, patient participation in health care encounters depends on a complex interplay of personal, provider, and contextual factors.

**Parent-Provider Communication**

Effective communication between a parent and their child’s health care provider is associated with positive child health outcomes (Nobile Hart, Kelleher, Drotar, & Hudson Scholle, 2007). Specifically, better communication between a parent and a provider improves parental satisfaction and increases parental disclosure of psychosocial concerns (Nobile Hart et al., 2007). Moreover, effective communication impacts adherence to health care regimens directly and indirectly. Clear communication promotes trust in the therapeutic relationship, and improves understanding of the role that beliefs, attitudes and social or cultural norms play in adherence in both preventive and chronic disease treatment plans (Rosenthal, Socolar, DeWalt, Pignone, Garrett, et al., 2007). Conversely, mismatches in an information exchange, including the expectations for and goals of the encounter between a parent and provider, can alter the perceptions of effectiveness of that encounter (Sarkar et al., 2011).

Importantly, parent-provider communication differs across the context of pediatric care. For instance, pediatric primary care focuses on anticipatory guidance, periodic ambulatory health care services, episodic illness, and developmental or psychosocial concerns, while chronic illness necessitates comprehensive education about diagnosis, illness and treatment and attendant consequences. Notably, evidence indicates that parent-provider communication, particularly within the context of pediatric primary or ambulatory care may be less than optimal (Centers for Disease Control & National Center for Health Statistics, 2008).
Parental perception of the quality of communication appears to be a stronger predictor of satisfaction with care than other objective measures of communication, particularly in the ambulatory care setting. For example, Street (2012) found that physician use of patient-centered statements predicted parents’ perceptions of physicians’ interpersonal sensitivity and partnership building, but that the amount of information physicians provided parents was unrelated to their judgments of the providers’ information giving. Evidence further supports a significant mismatch between information provided to parents and information desired. According to a survey of a nationally representative sample of 2012 parents with young children, 79% of parents indicated they could use more information in at least one of six areas of child rearing while 53% wanted more information in at least three areas (Child and Adolescent Health Measurement Initiative, 2000). As a result of suboptimal communication, parents may lack potentially important knowledge regarding their child’s health or illness, including appropriate treatment options (Centers for Disease Control & National Center for Health Statistics, 2008). Importantly, parental education level also plays a substantial role in parent and provider communication behaviors. A higher level of maternal education has been associated with greater support, positive affect and partnership by physicians. Further, parents with greater education levels are more likely to ask questions and express concerns and opinions (Nobile Hart et al., 2007).

Low-income parents, particularly those of racial or ethnic minority groups, and parents who possess limited language proficiency or do not speak English are at substantial risk for poor communication with providers (Bloom et al., 2011). For example, low-income Spanish speaking parents of publicly insured children who used
clinics or hospital outpatient departments as their usual source of care were 9.5% more likely to report communication problems compared with those whose usual source of care was a doctor’s office or HMO office (Bloom et al., 2011). Moreover, evidence indicates that significant differences exist in overall family-centered care between white children and Latino children, even after controlling for interview language and other factors (Pleasant, 2009). Health related content delivered in a culturally appropriate and family-centered way plays an important role in supporting wellness and appropriate child development for vulnerable populations and is significantly associated with improved perceptions of quality of care received (National Initiative for Children's Healthcare Quality, 2005). Given the important known associations between HL, educational attainment, income, race, ethnicity, age, and limited English-speaking ability (Kutner et al., 2006; Paasche-Orlow et al., 2005) and the above discussion regarding the impact of communication on care, it is especially important to examine communication within the context of HL.

**Patient-Provider Communication and Health Literacy**

Although substantial evidence indicates that low HL is associated with poorer health outcomes and inefficient use of health care services, the mechanisms by which these effects occur are not yet clear. As previously noted, HL is a multidimensional concept. A person’s level of HL likely depends upon their cognitive development as well as their exposure to different communication content and methods (Nutbeam, 2000). Thus, a person’s interactive communication skills may markedly influence their ability to act on health related information (Nutbeam, 2000, 2008). Moreover, communication and information processing problems may substantially influence the participatory
dimensions of the patient-provider relationship, shape patient decision-making and affect involvement in care (Schillinger, Bindman, Wang, Stewart, & Piette, 2004; Schillinger et al., 2003).

Importantly, evidence from studies regarding adults concerned with self-care suggests that individuals with low HL have difficulty understanding and recalling complex information, including the explanation of condition and processes of care, delivered orally during an encounter (Schillinger et al., 2004; Williams et al., 1998). Moreover, the level of a patient’s HL may modify the relationship between the provider’s information giving and the patient’s perception of it, suggesting that health care communications are perceived differently depending on level of HL (Ishikawa et al., 2009). Significantly, individuals with low HL report less satisfying health care visits than their more health literate counterparts (Schillinger et al., 2004) and are less likely to actively participate in health-related dialogue and decision-making processes (Roter, 2005). Indeed, greater patient speaking and listening skills have been associated with greater patient activation and advocacy (Schillinger et al., 2004). Finally, cultural and language barriers can further alter interactive communication. Language, literacy and numeracy are elements of social interaction (Brugge, Edgar, George, Heung, & Laws, 2009). In fact, for some populations, there may be no clear demarcation between the influence of language and/or culture, level of education and HL, on interpersonal interactions with providers (Brugge et al., 2009; Sudore et al., 2009). Separate or together, they are each meaningful factors that affect communication between these patients and their providers (Brugge et al., 2009).
Parent-Provider Communication and Health Literacy

At present, few studies specifically examine the relationships between parental HL and communicative interaction within the pediatric medical encounter. As noted however, substantial research indicates that effective parent-provider communication is generally associated with parental satisfaction with care, adherence to treatment recommendations, the building of trust in the therapeutic relationship, and improved discussion of psychosocial concerns, an integral component of pediatric ambulatory health care (Centers for Disease Control & National Center for Health Statistics, 2008; Rosenthal, Socolar, DeWalt, Pignone, Garrett, et al., 2007). Conversely, poor communication, especially among low-income populations, or foreign-born or non-native English-speaking parents, may contribute to poor child health outcomes and exacerbate pediatric health disparities (Bloom et al., 2011).

Although evidence discussed above suggests a relationship between low parental HL and pediatric health outcomes, none of those studies explicitly examined the relationships between caregiver or parental HL and specific domains associated with interactive or interpersonal communication between parent and provider. In fact, very few studies have plainly explored the association of parental HL on variables representing one or more aspects of the communication construct.

In the most relevant study done to date, Rosenthal and colleagues (2007) assessed 157 caregivers, 69% of whom received Medicaid and 34% of whom scored below a ninth-grade reading level who sought care for their children from a single pediatric residency clinic, to determine whether level of parental HL could successfully identify children at risk for sub-optimal pediatric ambulatory health care services. Researchers
measured HL using the Rapid Estimate of Adult Literacy in Medicine (REALM) and assessed the quality of pediatric health care using 5 subscales from the Promoting Healthy Development Survey (PHDS) that were relevant to parent-provider relationships or content of a medical encounter. In unadjusted analysis, parents with low HL (REALM scores of < 61) were more likely than those with higher HL (REALM score ≥ 61) to report better “family-centered care” (79% vs. 60%, p = .01) and “helpfulness and confidence building” (91% vs. 71%, p = .006). No difference by level of HL was found for “psychosocial issues,” “safety issues,” or “anticipatory guidance” (Rosenthal, Socolar, DeWalt, Pignone, Garrett, et al., 2007). When adjusted in logistic regression models for caregiver gender, race, parents living together, insurance status, income and child age, the associations remained: “family-centered care” (79% vs. 61%, p = .03) and “helpfulness and confidence building” (79% vs. 57%, p = .01).

Perhaps unexpected, these results indicate that parental HL plays some role in the parent-provider relationship and consequently, may influence concomitant communication. Importantly, feelings of marginalization, given study respondents’ low socioeconomic status, low education and poor HL levels, may have influenced responses or lowered parental expectations of care (Rosenthal, Socolar, DeWalt, Pignone, Garrett, et al., 2007). In addition, face-to-face administration of the tools at the institution where they received care for their children may have increased the likelihood that respondents gave socially acceptable answers, particularly when queried regarding parent-provider relationships. Conversely, the outcome may have been influenced by the researchers grouping parents into two groups, those with low literacy, defined as a REALM score of < 61, and those with high literacy, a REALM score of ≥ 61. In fact, scores for the
REALM are frequently reported according to grade level, with a score of 0 – 18 corresponding to a reading level of 3rd and below, a score of 19 - 44, a reading level of 4th to 6th grade, a score of 45 to 60, 7th to 8th grade and a score of 61 or greater, reflecting a reading level of 9th grade and above (Davis et al., 1993). Dichotomizing participants into two groups, low HL or high HL may have masked subtle distinctions between those parents with marginal HL and “low” or “high” HL. In fact, whether the relationship between HL and health outcomes is continuous and graded, or whether a threshold exists below which a person’s reading ability is so limited that they are unable to do things needed to maintain health remains unclear (Agency for Healthcare Research and Quality, 2002). Finally, the cross-sectional study was conducted at a single institution with resident physicians whose institution specific training limits generalizability.

A second study conducted by Farrell and colleagues (2011) examined communication and psychosocial outcomes following identification of cystic fibrosis (CF) or sickle cell (SC) carrier status by a state newborn screening program. Specifically, researchers contacted 206 parents of infants with SC carrier status and 91 parents of infants with likely CF carrier status by telephone and queried them regarding their description of communication with their primary care provider (PCP). Health literacy was measured using a 3-item screener (tool not specified by study authors) that identified 25 parents (9%) as being significantly limited in HL and another 83 parents (29.9%) as having occasional problems in HL. All parents of likely CF carrier infants recalled an explanation of carrier status except for one, despite that infant having gone through the sweat testing process, while 38.5% of the SC carrier infants did not recall an explanation from their PCP. When asked about how well the PCP had explained the
carrier status results, 48.5% of all parents responded “well” or “very well.” Parents responded similarly to a question about their general satisfaction with the newborn screening experience (specific results not provided by study authors). Greater satisfaction was related to whether parents remembered an explanation or if they evaluated the PCP’s explanation favorably ($\chi^2, p \leq 0.01$). No difference in satisfaction was noted between parents of likely CF carrier infants versus SC carrier infants, however, parents with inadequate or marginal HL were more likely to evaluate PCP explanations unfavorably ($\chi^2, p = 0.04$) (Farrell et al., 2011). Unfortunately, the limited number of parents of CF carrier infants and the abbreviated published report precludes substantial analysis of these results, the study offers further support for some link between parental HL and parental perception of the quality of health encounter communication.

Finally, a third study indirectly examined parent-provider relationships within the context of parental HL. In a school-based setting in upstate New York, Shone (2007) surveyed the parents or caregivers of 499 children with asthma aged 3 to 10 years and discovered that parents with low HL worried more ($p < .001$), and perceived greater overall burden from their child’s asthma ($p < .001$), though reported health care use did not vary. In addition, low HL parents had worse scores for asthma knowledge ($p < .001$), treatment expectations ($p < .001$) and interactions with providers ($p < .001$), and had higher scores for perceived need for medications ($p < .001$). The demographics of the sample, an impoverished and predominantly minority community, limits generalizability of these findings but these results underscore the complicated relationships between HL, chronic illness, race/ethnicity, socioeconomic status and interpersonal communication abilities.
Unfortunately, the paucity of evidence examining interpersonal interaction or communication constructs and child or parental outcomes within the context of parental HL severely limits any assertions about potential relationships among these concepts. While recent trends in the study of HL support a more expansive notion of HL that conceives of HL as socially co-constructed with providers, no empiric tools presently exist to measure this co-construction (Pleasant, 2009; Wolf et al., 2009). Thus, the interactive communicative components of HL, particularly within the context of the parent-provider relationship remain speculative (Rubin, Parmer, Freimuth, Kaley, & Okundaye, 2011).

**Provider Understanding of Health Literacy**

The vast majority of HL research frames HL as a patient deficit rather than as an asset upon which patients and providers can build (Nutbeam, 2008; Rubin et al., 2011). Yet, cultivating HL through provider education or improved communication efforts may mitigate adverse effects of low HL. In addition, communicative interaction is most certainly hindered when providers misjudge a patient’s level of HL. In fact, most studies to date have found provider awareness and understanding of limited HL to be low. Thus, when examining communication within the context of HL, understanding provider conceptions of it are essential.

For example, of 240 multidisciplinary health care providers (HCPs) attending a university-sponsored educational session on health literacy, fewer than 12% of the participants correctly estimated the prevalence of HL among U.S. adults (Jukkala, Dupree, & Graham, 2009). Notably, participants believed that a person’s level of HL could be determined by specific demographic characteristics and some participants
wrongly believed that persons with higher levels of education were not at risk for limited HL. Perhaps more troubling, 16% of participants reported having not heard of “health literacy” prior to the educational offering with nurses having the highest rate of no prior knowledge at 17.1% (Jukkala et al., 2009). In a survey of 36 allied HCPs, Brown and colleagues (2004) found that one third of respondents were unaware of the impact of inadequate HL on patient care and possessed no knowledge of health literacy resources.

Moreover, several studies indicate that providers do not accurately identify individuals with low HL (Bass, Wilson, Griffith, & Barnett, 2002; Rodgers, Wallace, & Weiss, 2006). For example, researchers assessed whether medical residents could identify patients with poor literacy skills based on clinical interactions during a continuity clinic visit. Residents identified only 10% of the patients as having limited HL, yet of the 90% of patients that the residents perceived as having adequate HL, 36% failed a literacy screen (Bass et al., 2002). In another study involving family medicine residents at a university-based family medicine clinic, residents were able to accurately identify only half of the low health literate patients as having poor or below average understanding of medical information (Rodgers et al., 2006).

Several studies have measured provider communication methods with low literate patients. Schwartzberg and associates (2007) explored the self-reported techniques used by 307 HCPs (99 physicians, 87 nurses and 121 pharmacists) who attended state and national conferences. The most commonly used techniques by participants included “using simple language” (94.7%), “providing printed materials” (70.3%), “speaking slowly” (67.3%) and “reading instructions aloud” (59.1%). However, less than 40%
routinely used the “teach-back” method promoted by HL experts. Significant differences by profession were not evident.

Schlichting (2007) surveyed 333 HCPs, including 144 physicians, 67 nurse practitioners, 35 physician’s assistants, 48 dentists and dental hygienists and 36 other professionals including registered nurses, in mid-western urban and rural community health centers for techniques used when caring for clients with limited HL. The HCPs reported techniques used “always” or “often” as “asking patient’s understanding” (96%), “reviewing instructions carefully” (95%), “using layman’s terms” (95%), and “providing printed health education materials” (86%). The “teach-back” method was employed by 66% of these HCPs but only 35% provided health materials designed for patients with low HL. Notably, 62% of providers considered HL to be a low priority compared to other patient needs.

Additionally, in a study exploring nursing professionals knowledge of HL, investigators found that only 42% of nurses provided their patients with educational material designed for patients with low HL, that 27% “never” or “rarely” asked whether a patient had difficulty reading medical information or completing medical forms, and 53% considered HL to be a low priority compared with other problems (Macabasco-O’Connell & Fry-Bowers, 2011). The techniques used most by nurses to assist patients with low HL included asking patients whether they understand the instructions given or have any questions (77%), asking patients to repeat instructions back to them (65%), and asking if patients have difficulty reading medical information or completing medical forms (30%). Thirty-eight percent stated they did not have time to take part in a HL training program, and 12% percent believed that there would be no organizational support for such
programs. Notably, 32% percent also perceived that it would be too difficult to implement a patient program to support those individuals with limited HL at sites where patients speak many different languages or to implement one that is culturally competent (19%) (Macabasco-O'Connell & Fry-Bowers, 2011).

Finally, a national random sample of pediatricians (n = 900) revealed 81% of pediatricians reported being aware in the previous year that a parent had not sufficiently understood medical information given them and 44% reported that they were aware of an error in patient care that resulted from a parental communication or literacy deficits, with 15% of those describing the error as resulting in “moderate-to-great” harm to the patient (Turner et al., 2009). Eighty-eight percent of respondents felt they were good or excellent at converting medical terminology into plain language and not surprisingly then, 99% stated that using everyday language was a technique used “always” or “most of the time.” Only 21% of the pediatricians however, felt that they were “excellent” or “very good” at identifying a parent with limited HL. Although 69% of respondents asked about primary language spoken in the home, only about a quarter asked about highest level of education completed by the mother (24%) or a history of parental reading difficulty (27%), known correlates of limited HL. Importantly, 51% of these pediatricians agreed that there was “not enough time in a pediatric visit to use special communication techniques,” so it is not surprising that less than a quarter (23%) used enhanced communication techniques such as “teach-back” or asked parents to repeat back information discussed (Turner et al., 2009, p. S302). In addition to limited time, the respondents also noted the volume of information (65%), complexity of information
(64%), divided attention demands (55%) and lack of reimbursement for patient education (41%) as substantial barriers to effective communication (Turner et al., 2009).

Collectively, these studies reveal that HCPs lack sufficient knowledge and understanding of HL and as a result, may fail to act or act inappropriately in response to a patient with low HL. Moreover, institutional and policy factors may influence how providers respond to HL issues. Interestingly, while the pediatricians above indicated awareness of insufficient parental understanding of information and felt that they were very good or excellent at using plain language to explain health care information, studies reveal that parents are not having information needs met (Centers for Disease Control & National Center for Health Statistics, 2008; Child and Adolescent Health Measurement Initiative, 2000). Providers may miss subtle clues of limited literacy such as “I left my glasses at home,” or “I don’t have time to read this today.” They may not realize that a patient or parent who answers that they have no questions may indeed have many questions but may lack confidence or ability to ask. Further, providers may interpret a patient’s failure to engage as disinterest rather than a true inability to participate for lack of adequate understanding. Unfortunately, these mistakes can have devastating consequences and severely disrupt communication and the patient/parent provider relationship (Abrams et al., 2007; Cordell, 2011).

**Implications for Practice**

A “patient-centered” model of health care cannot be achieved if patients and their families have difficulty understanding, processing and acting on health related information (Holmes, Bacon, Dobson, McGorty, & Silberman, 2007). The promise of this model depends on fundamental change in patient/parent provider communication
moving from the syntax and language of HCPs to plain, culturally appropriate language that each patient or family member can understand (Holmes et al., 2007).

As noted above, limited HL can profoundly impact what takes place during the health care encounter. However, in general, HCPs do not accurately identify individuals with low HL. While some experts have developed brief screening tools (Chew, Bradley, & Boyko, 2004; Weiss et al., 2005a), routine use of these tools remains controversial (Abrams et al., 2007; M.S. Wolf, Mark V. Williams, et al., 2007). Therefore, many experts advocate for a “universal precautions” approach meaning that providers should structure each health care encounter as if every patient/family member may have limited HL (D. DeWalt et al., 2011). Towards this end, the Agency for Healthcare Research and Quality (AHRQ) promotes use of the Health Literacy Universal Precautions Toolkit. While primarily aimed at adult and pediatric primary care practices, this toolkit offers methods to assess services for HL considerations, raise awareness of staff and implement strategies to minimize the impacts of low HL (Agency for Healthcare Research and Quality, 2011).

In addition, all HCPs should incorporate specific evidence-based “best practices” into their routine care of patients and families. For example, the Partnership for Clear Health Communication offers practical guidance for improving the dialogue between patients and providers. In addition to using plain language, HCPs are encouraged to sit down to achieve eye-level with a patient while talking, break information down by speaking in short sentences, use visual models and pictures to explain a condition or procedure, minimize interruptions while speaking with the patient, and create a safe environment where patients/family members feel comfortable asking questions and
advocating for themselves (Pfizer, 2011). Moreover, clinicians should routinely implement the “chunk and check” and “teach-back” methods when providing patients and families with information. “Chunk and check” requires providers to organize information into two or three concepts, provide that information to the patient or family member and then check for understanding before moving on to additional information (Abrams et al., 2007). While many providers state they use a “teach-back” approach, they should understand that the using the “teach-back” method does not mean asking “yes” or “no” questions but rather, it includes use of phrases such as “We have gone over a lot of information today. Can you tell me what you heard in your own words? How will you make it work for you at home?” (Abrams et al., 2007). These methods can help clinicians to increase the interactivity of the encounter and improve chances for the expression of patient voice (Roter, 2011).

**Conclusion**

Clear communication between a parent and their provider is a key determinant of their child’s health. Although the mechanisms remain unclear, evidence indicates that HL plays some role in whether health care encounters are beneficial and productive. Clearly, additional research is necessary to better illuminate those factors that help or hinder information exchange between a HCP and a parent or caregiver with or at risk for limited HL. In the meantime, clinicians must institute practical strategies as outlined above to reduce the burden of low HL in face-to-face encounters with patients and families.
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The Association of Health Literacy, Social Support and Self-Efficacy with Interpersonal Interactions with Health Care Providers in Low-Income Latina Mothers

Abstract

Objective. Evidence linking low maternal HL (MHL) to suboptimal pediatric health outcomes is inconsistent. Social support may reduce the negative effects of low maternal HL by improving the mother’s ability to acquire and understand health information and navigate the health care system and may account for some of the conflicting findings. Maternal self-efficacy (MSE) in patient-provider interactions may also influence information exchange and play a key role in health-related communication, particularly in patients with limited HL.

Methods. We conducted a cross-sectional study of low-income Latina mothers and female caregivers of children 3 months to 4 years in WIC clinics. We assessed maternal HL with the Newest Vital Sign, self-efficacy using Perceived Efficacy in Patient-Physician Interactions (PEPPI), social support with the Family Support Scale, and interpersonal interactions with the Interpersonal Processes of Care in Diverse Populations (IPC) survey.

Results. In a sample of 124 Latina mothers of children aged 3 to 48 months, MHL was significantly correlated with IPC domain “discriminated due to race/ethnicity,” \( r = -0.207, p = .021 \), but did not significantly predict “discrimination due to race/ethnicity, \( b = -0.026, t(101) = -0.603, p = .548 \) or explain a statistically significant proportion of the variance in scores for “discrimination due to race/ethnicity”, \( R^2 = .019, F(4, 101) = .476, p = .753 \). Informal support significantly predicted MSE, \( b = .192, \)
\( t(101) = 2.041, p = .044 \), and explained 13.9\% of the variance in MSE scores, \( R^2 = .139 \), \( F(5, 101) = 3.262, p = .009 \). In addition, MSE significantly predicted maternal perception of her child’s HCP’s ability to elicit and respond to her concerns, \( b = .020 \), \( t(101) = 2.524, p = .013 \), and that model also explained a statistically significant portion of the variance in the scores for “elicits concerns,” \( R^2 = .145 \), \( F(5, 101) = 3.437, p = .007 \).

**Conclusions.** Important relationships between MSE and informal support, and MSE and “elicits concerns” were noted. Clarifying the interrelationships between these variables is an important step towards understanding how these factors impact maternal interaction with the health care system or influence pediatric health disparities.

**Introduction**

Most children are healthy and experience low rates of morbidity and mortality. Therefore, health outcomes are skewed toward the higher ends of the health continuum (Mangione-Smith & McGlynn, 1998). As a result, preventive care in pediatrics, including the communication of anticipatory guidance recommendations, is emphasized and plays a substantial role in determining the quality of pediatric care received. Unfortunately, problems with timeliness, accessibility, effectiveness, efficiency and equity of children’s healthcare are well documented (Agency for Healthcare Research and Quality, 2002). In fact, children seen in ambulatory care settings often receive less than 50\% of recommended care (Mangione-Smith et al., 2007). During a pediatric health care encounter, parents must provide information, respond to questions, and make inquiries associated with health or illness concerns regarding their child. Inadequate interpersonal processes coupled with conflicting beliefs, perceptions and expectations regarding care and low health literacy can negatively impact this exchange (Hart, Drotar,
Importantly, experts agree that high quality health care is a product of good interpersonal processes of care (Institute of Medicine, 2001).

Interpersonal processes of pediatric health care include the social-psychological aspects of parent-provider interaction such as communication, friendliness, explanations, and being caring and sensitive to parent’s/child’s needs (Stewart, Napoles-Springer, & Perez-Stable, 1999). Effective interpersonal processes are associated with parental satisfaction with care, adherence to treatment recommendations, trust in the therapeutic relationship and improved discussion of psychosocial concerns (DiMatteo, 2004; Nobile & Drotar, 2003).

Health literacy (HL), or literacy within the context of the health care system, includes communication or information processing skills that extend beyond functional reading abilities (Nutbeam, 2000, 2008). Accordingly, low HL can influence the participatory dimensions of the patient-provider relationship, shape patient decision-making and affect involvement in care (Schillinger et al., 2004; Schillinger et al., 2003). Importantly, low HL is strongly associated with low educational attainment, low income, race, ethnicity, age, and limited English-speaking ability (Kutner et al., 2006; Paasche-Orlow et al., 2005), and may contribute to exacerbation of health inequity among these populations.

Substantial evidence links low HL to poor health outcomes in adult populations (D. A. DeWalt et al., 2004). Recent studies also connect low parental HL to suboptimal pediatric health outcomes (D. A. DeWalt et al., 2007; Ross et al., 2001; Shone et al., 2009; Yin et al., 2007). Other evidence however, finds no relationship between these
factors (Hironaka et al., 2009; Moon et al., 1998; Sanders et al., 2007). One possible explanation for the equivocal findings may result from social support offered to parents of children by grandparents, siblings, babysitters, teachers and family friends. Such social support may “blunt” the negative effects of low parental HL in some populations. Indeed, many individuals report requiring assistance from family or friends when dealing with health related information (Lee, Arozullah, & Cho, 2004). Social support, especially in the form of familial role models, may be important for low-income mothers with low HL and may play a special role for Latina mothers who often rely on family members for support during a child’s illness or in seeking health care services (Clark, 2002). These social networks may improve their ability to understand health-related information and navigate the health system.

Self-efficacy in patient-provider interactions may also play a key role in health-related communication, particularly in patients with limited HL. Self-efficacy, defined as one’s own ability to perform specific behaviors (Bandura, 1977), influences information exchange, recall of health information, satisfaction with care, self-management and patient outcomes (Heisler, Boulknight, Haywood, Smith, & Kerr, 2002; Katz, Jacobsen, Veledar, & Kripalani, 2007; Sarkar, Fisher, & Schillinger, 2006). Low self-efficacy in patient-provider interactions results in decreased satisfaction with care, diminished confidence in HCPs and worse symptom distress (Maliski et al., 2004). Significantly, one’s level of HL has been identified as a predictor of self-efficacy in the context of diabetes, HIV-self care and colorectal screening (Ishikawa et al., 2008; von Wagner, Semmler, Good, & Wardle, 2009; M.S. Wolf, T.C. Davis, et al., 2007).

Low income and socially marginalized individuals often possess lower self-esteem,
lower self-efficacy and a lower sense of self-mastery, and frequently experience worse health outcomes than those who possess higher levels of these characteristics (Baker et al., 1996; Blacksher, 2002). Moreover, low-income women and those individuals specifically at risk for low HL, frequently report dissatisfaction with patient-provider communication (Hawley et al., 2008; Perez, Sribney, & Rodriuez, 2009; Smith, Dixon, Trevena, Nutbeam, & McCaffery, 2009). For example, evidence indicates that Latino parents are less likely than other parents to report that their children’s health care provider (HCP) always listens carefully to them or their children, that their child’s HCP always explains things in a way they can understand, or that the HCP spends enough time with them (Agency for Healthcare Research and Quality, 2002).

Given this context, the purpose of this study was to explore the relationships between maternal HL, self-efficacy in interpersonal interactions and access to / helpfulness of social support among low-income Latina mothers of young children. Further, we examined the influence of these factors on interpersonal processes of care between these mothers and their HCPs. Elucidating the interrelationships between these variables, especially for a low-income minority population, is an important step towards understanding how these factors impact maternal interaction with the health care system or influence pediatric health disparities.

Methods

Participants

Low-income Latina English- or Spanish-speaking mothers or female primary care givers of children aged 3 months to 4 years, who had utilized health care services for
their child within the previous six months, were recruited from five different WIC\textsuperscript{1} clinics in southern California during August and September 2011 to participate in this cross-sectional study. Receipt of WIC benefits\textsuperscript{1} served as the proxy measure for low-income status. Mothers or female primary care givers who were not low-income English- or Spanish-speaking Latinas were excluded from this study. Further exclusion criteria included no use of health care services in the past six months, if the child did not meet age criteria or if the child had chronic illness, defined as a having a health problem lasting over three months, which affected the child’s normal activities, and required hospitalizations, home health care and/or extensive medical care (Cohen et al., 2011). Fathers and male caregivers were also excluded given the possibility that culturally defined gender differences in parenting roles might influence interpersonal processes. The Institutional Review Board of the University of California, Los Angeles, approved this study.

**Procedure**

Flyers posted in the waiting areas of five different WIC clinics notified potential participants of the pending study. Study personnel, an English-speaking principal investigator (EFB) and two bicultural, bilingual research assistants, interviewed interested mothers and caregivers in their preferred language in a private area of each respective clinic to determine eligibility. If eligible, the participant was informed of her rights as a human subject and her consent to participate was obtained. Study personnel administered a brief test of the participant’s level of HL, described below, and then requested that the participant complete surveys to assess demographic, self-efficacy,

\textsuperscript{1} WIC is a federally funded health and nutrition program for pregnant women, infants, and children under age five who are at or below 185 percent of the federal poverty level (FPL). Income eligibility in California was set at 185% of the FPL at the time of this study.
social support and interpersonal interaction variables. Study personnel offered to read
surveys to accommodate limited literacy; two participants requested such assistance
(1.6%). A $20 gift card to a local grocery-retail store was given to each participant upon
completion of the study.

Measures

Demographics. Demographic data included participant’s age, level of education,
number of children and adults in home, child health insurance status, whether the child
received care from a regular place and regular HCP, and family living arrangements.
Acculturation and language use was assessed with the valid and reliable Short
Acculturation Scale for Hispanics (SASH) (Edelman, Christian, & Mosca, 2009; Marin,
Sabogal, Marin, Oter-Sabogal, & Perez-Stable, 1987), which includes the following
questions: “what language(s) do you read and speak?”, “what language(s) do you usually
speak at home?”, “in which language(s) do you usually think?”, “what language(s) do
you usually speak with your friends.” We added a fifth question due to the high number
of immigrants in our region: “what language(s) did you use as a child?” The SASH was
scored using a 5-point Likert scale (1=only Spanish, 2=Spanish more than English,
3=both equally, 4=English more than Spanish, 5= only English). Mean scores of less
than 3 indicates a lower level of acculturation based on language use (Edelman et al.,
2009; Marin et al., 1987). Participants were also asked to report country of birth and
number of years in United States.

Maternal health literacy. We assessed maternal HL using the Newest Vital Sign
(NVS) (Pfizer, 2012), available in English or Spanish, which assesses an individual’s
prose literacy, numeracy and document literacy using six questions about information on
a nutrition label from an ice-cream container. Each correct answer is given one point. According to the NVS, a score of 0 to 1 suggests a “high likelihood of low HL,” 2 to 3 suggests the “possibility of low HL,” while 4 to 6 generally indicates “adequate HL” (Weiss et al., 2005b). Here, we used HL as a continuous variable and calculated a mean score for the purposes of our analyses.

**Maternal social support.** Social support was examined using the *Family Support Scale* (FSS) (Dunst, Jenkins, & Trivette, 1984), a 19 item scale, available in both English and Spanish, that reflects various sources of support from individuals and groups to families rearing a young child and measures the helpfulness of each on a 5-point scale ranging from “not at all helpful” (1) to “extremely helpful” (5) (Dunst et al., 1984). The scale is organized into five subscales: kinship (e.g., parents, relatives), spouse/partner support, social organizations (e.g., parent groups, social clubs), informal support (e.g., friends, neighbors, other parents, church) and professional services. Mean scores for each of the subscales allow for comparison between sources of support. The unadjusted score, ranging from 0 to 20, for the professional services subscale represents the Formal Social Support Score, while the unadjusted scores for the remaining four subscales are summed to achieve the Informal Social Support Score, which can span from 0 to 75. The Total Family Social Support Score is achieved by adding these two scores for a total score ranging from 0 to 95. Higher scores connote greater availability of helpful support.

**Maternal self-efficacy.** Maternal self-efficacy or confidence in their interaction with providers was measured using the English or Spanish version of the *Perceived Efficacy in Patient-Physician Interactions* (PEPPI), a ten item test reported as a mean score that measures the subjective sense of patients’ confidence when meeting with their
HCPs (Maly, Frank, Marshall, DiMatteo, & Reuben, 1998). Ten Likert-style questions assess a patient’s confidence in communicating, eliciting and understanding information from their HCPs, as well as confidence in their ability to get HCPs to address and act on their main health related concerns (Maly et al., 1998). Each item begins with “How confident are you in your ability to…” with participants responding to each question on a scale from 1 (“not at all confident”) to 5 (“very confident”). Total score ranges from 10 to 50 with higher scores denoting higher self-efficacy.

**Interpersonal processes of care.** We measured maternal perception of interpersonal interactions with HCPs using the English or Spanish version of the short form of the *Interpersonal Processes of Care in Diverse Populations* (IPC) survey, a 18-item survey that incorporates specific issues of interaction significant to minority and low income groups (Stewart et al., 1999). The IPC addresses three domains of interpersonal interaction: communication, decision making, and interpersonal style, each with one or more subscales (Stewart et al., 1999). The communication domain subscales measure lack of clarity in communication, whether the provider elicited and responded to parent concerns and whether the provider explained results. The decision-making domain asks whether the parent and provider worked together to decide a plan of care. Finally, the interpersonal style domain measures whether the parent perceives the provider to be compassionate and respectful in their care, whether they feel discriminated against due to their race or ethnicity, and whether the office staff is disrespectful. Participants answer questions about their experiences in talking with their HCP and mostly begin with “How often did your provider …” with possible responses ranging from “1” (never) to “5” (always). A mean score is obtained for each subscale. A higher frequency of the labeled
interpersonal process results in a higher score. In some cases, higher scores indicate better processes and in others, worse processes (Stewart, Nápoles-Springer, Gregorich, & Santoyo-Olsson, 2007). For example, high scores for “lack of clarity,” “discriminated due to race/ethnicity,” and “disrespectful office staff” indicate poor interpersonal process.

**Data Analyses**

We calculated descriptive statistics for all demographic data, the maternal HL score, the maternal self-efficacy score and the maternal interpersonal processes of care scores. Individual demographic variables and social support scores were examined as possible correlates of maternal HL using Pearson’s correlation coefficient. In addition, we examined relationships between level of HL and social support, maternal self-efficacy and maternal interpersonal processes of care. Regression analyses were conducted to further evaluate the strength of the relationships noted between the variables of interest, controlling for statistically relevant demographic variables and correlates. Child health insurance, and usual provider and place of care were not included in any of the models due to the lack of variability within our sample. In addition, we excluded years in the U.S. due to the high number of non-responses to that question and potential for response bias. Finally, because education and literacy are causally related, we did not include education level in the models (D. A. DeWalt & Pignone, 2005; Rosenthal, Socolar, DeWalt, Pignone, Garret, et al., 2007; von Wagner et al., 2009). All analyses were conducted using the Statistical Package for the Social Sciences (SPSS), version 19.0 (SPSS Inc., Chicago, IL).
Results

Demographics

Our sample consisted of 124 Latina mothers and female caregivers, with an average age of 30.25 years ($SD = 7.51$). Slightly more than 61% had completed high school education. The basic demographics of the sample are presented in Table 5-1. The vast majority of the sample reported that their child had some form of health insurance ($n = 120, 96.8\%$), access to a regular place for care ($n = 116, 93.5\%$), and regular provider of care ($n = 112, 90.3\%$) for their child. The insurance coverage data is consistent with regional estimates for Latino children, less than 6 months to 4 years of age (California Health Interview Survey, 2009; Grant & Kurosky, 2008) but does not reflect whether such coverage was uninterrupted throughout the year. Mean maternal acculturation score was $2.57 (SD = 1.39)$ indicating a moderately low level of acculturation based upon preferred use of language.

Descriptive Statistics

Health literacy scores for our sample were distributed as follows: high likelihood of low HL ($n = 53, 42.7\%$), possibility of low HL ($n = 43, 34.6\%$) and adequate HL ($n = 28, 22.6\%$), with a sample mean score of $2.19 (SD = 1.73)$. Thus, adding together those with a high likelihood of low HL and those with a possibility of low HL, a majority of our participants ($n = 96, 77.4\%$) were at risk for encountering substantial challenges when interacting with the health care system which is consistent with national estimates of HL among this population (Kirsch et al., 2002). There was a statistically significant difference between the HL groups for means for maternal age ($p = .008$), number of
children in home \((p = .012)\), and level of maternal acculturation \((p < .001)\). As a result, we controlled for these variables in subsequent regression analyses.

Social support scores were as follows: kinship support \((M = 3.03, SD = 1.61)\), spouse/partner support \((M = 2.79, SD = 1.52)\), informal support \((M = 1.68, SD = 1.12)\), social organizations \((M = 0.88, SD = 1.08)\), and professional services \((M = 1.63, SD = 1.29)\). Among the subscales, the greatest source of support to participants appeared to come from kin, which included the mother’s parents or relatives. The mean Informal Social Support Score was 27.88 \((SD = 14.46)\), the mean Formal Support Score was 6.38 \((SD = 5.12)\) and the mean Total Family Social Support Score 34.26 \((SD = 17.99)\). Finally, participants had a mean self-efficacy interaction score of 39.12 \((SD = 11.16)\). Table 5-2 reviews mean scores for the communication, decision-making and interpersonal style subscales of the IPC.

**Inferential Statistics**

Bivariate correlations for key demographic variables, maternal HL, and social support are presented in Table 5-3. Pearson’s correlation coefficient analyses revealed a statistically significant positive correlation between maternal HL and level of maternal acculturation \((r = .312, p < .001)\), indicating that as the level of maternal acculturation increased, maternal HL scores also rose. Table 4 shows the relationships between maternal HL, social support, maternal self-efficacy and maternal interpersonal processes of care.

Of the composite social support measures, the Formal Support Score trended toward a negative relationship with HL \((r = -.167, p = .063)\), possibly reflecting less reliance on professional support services by mothers with higher levels of HL.
addition, maternal HL was only marginally associated with self-efficacy \((r = .160, p = .076)\), and the IPC communication domains of “lack of clarity,” \((r = -.151, p = .095)\) and “elicits concerns,” \((r = .154, p = .088)\). Maternal HL, however, was significantly correlated with the IPC subscale, “discriminated due to race/ethnicity,” \((r = -.207, p = .021)\).

Maternal self-efficacy was positively correlated with the Informal Support Score \((r = .180, p = .046)\) and the Total Support Score \((r = .187, p = .037)\). As support scores increased, so did maternal self-efficacy scores. Notably, the Informal Support Score is a subscale of the Total Support Score, thus, informal support likely contributed substantially to the relationship between total support and maternal self-efficacy.

Maternal self-efficacy also correlated with the IPC subscale, “elicits concerns,” \((r = .245, p = .006)\) suggesting that self-efficacy plays some role in the process by which HCPs ask and answer questions of concern to the mother. Self-efficacy was also marginally associated with “explain results,” \((r = .154, p = .087)\) and “lack of clarity,” \((r = -.149, p = .099)\). Finally, multiple significant associations among the IPC subscales reveal complex inter-relationships between these interpersonal process domains for these participants. In particular, the IPC communication domain subscales of “elicits concerns” and “explains results” were significantly associated with each of the other IPC domains (Table 5-4).

We then conducted multiple regression analyses to further clarify the relationships identified between maternal HL and “discriminated due to race/ethnicity,” self-efficacy and the support variables, and self-efficacy and “elicits concerns.” After controlling for the demographic variables of age and number of children in home, as well as maternal acculturation, we found that maternal HL did not significantly predict “discrimination
due to race/ethnicity, $b = -.026, t(101) = -.603, p = .548$. Moreover, the model did not explain a statistically significant proportion of the variance in scores for “discrimination due to race/ethnicity”, $R^2 = .019, F(4, 101) = .476, p = .753$ (Table 5-5a).

Given the significant relationship between Informal Support and Formal Support Scores, we regressed informal support on self-efficacy while controlling for formal support, demographic variables and acculturation. The Informal Support Score significantly predicted maternal self-efficacy, $b = .192, t(101) = 2.041, p = .044$. In addition, the model also explained 13.9% of the variance in self-efficacy scores, $R^2 = .139, F(5, 101) = 3.262, p = .009$. Formal Support was not a significant predictor of self-efficacy in the model (Table 5-5b). Finally, when controlling for demographic variables, acculturation, and informal support, self-efficacy significantly predicted maternal perception of her child’s HCP’s ability to elicit and respond to her concerns, $b = .020, t(101) = 2.524, p = .013$. Further, the model also explained a statistically significant portion of the variance in the scores for “elicits concerns,” $R^2 = .145, F(5, 101) = 3.437, p = .007$ (Table 5-5c).

**Discussion**

To our knowledge, this is the first study to examine the relationships between maternal HL, social support, self-efficacy and interpersonal processes of care. Contrary to findings in adult patients with chronic illness (Schillinger et al., 2004), we did not find substantial relationships between maternal HL and the interpersonal process variables of interest. Further, we only noted a marginal relationship between maternal HL and self-efficacy for communicating with HCP. Other studies in pediatric settings have noted positive associations between maternal HL and self-efficacy for care (D. A. DeWalt et
al., 2007; Wood, Price, Dake, Telljohann, & Khuder, 2009). Here however, we examined self-efficacy within the context of a mother’s ability to communicate with HCPs rather than efficacy in performing specific care related functions, which could account for differences noted. Self-efficacy in performing tasks related to a child’s care might be more dependent on specific knowledge acquired through some form of education or parent instruction. As such, the functional aspects of HL, such as reading, likely exert a substantial influence, whereas self-efficacy in communication may be more dependent on social behaviors or other unknown factors related to life experiences and opportunities to develop efficacy. Finally, maternal HL trended toward a negative relationship with formal support. A paucity of research examines support within the context of HL and because the relationship did not reach statistical significance, we did not examine it further. It is possible, however, that mothers with lower levels of HL rely on the formal support provided by professional services in ways that mothers with higher levels of HL do not. Further investigation is needed to better understand this dynamic.

In this study, informal support represented support received from family members, friends, other parents, faith-based communities and day-care or the child’s school. We noted a clear relationship between maternal self-efficacy in communicating with HCPs and informal support. While this particular association has not been well examined, evidence indicates that such support plays an important role for mothers in regard to pediatric health care related behaviors (Clark, 2002; Schlickau & Wilson, 2005), and as a result, may also influence how a mother interacts with her child’s HCP (Heneghan, Mercer, & DeLeone, 2004). It could be that mothers learn from family members, friends or each other, what questions to ask of or what information to seek
from their child’s HCP and as a result, feel more prepared for or confident in their interactions with them.

We found an important relationship between maternal self-efficacy and the IPC communication domain, “elicits concerns.” This domain reflects whether the mothers felt that the HCP took time to discover the mother’s concerns or take those concerns seriously. We found that higher levels of maternal self-efficacy in communication predicted better processes for eliciting concerns. Evidence indicates that “active” patients can freely express their concerns to their providers and simply listening to the patient may be “enough” (Stewart et al., 1999). Others, particularly those from lower socioeconomic classes or who are non-white may have difficulty with “relationship-building utterances” (Gordon & Wolf, 2007, p. 11) or knowing how to express their health related questions. In these circumstances, the challenges of eliciting concerns falls more heavily on the HCP (Stewart et al., 1999). This is especially important for detecting psychosocial issues which are increasingly relevant in pediatric ambulatory care settings (Nobile Hart et al., 2007). Such “elicitation-type communication” provides essential information needed for shared decision-making and is critical to patient-centered care (Sarkar et al., 2011, p. 173). Our findings suggest that self-efficacy is a key component of “elicitation-type communication.” Thus, training in communication techniques that encourage and enable mothers to be more active participants in their child’s health visits may improve interaction and pediatric health outcomes. Importantly, HCPs need to be aware of and competently and sensitively inquire about social factors that may influence a mother’s care of her child, particularly among populations that face multiple barriers to care.
Self-efficacy was also marginally associated with “explain results,” $(r = .154, p = .087)$ and “lack of clarity,” $(r = -.149, p = .099)$. While not statistically significant for our sample, others have linked this “explanatory-type communication” to knowledge of one’s condition and plan for care (Sarkar et al., 2011, p. 174; Schillinger et al., 2004). Mothers cannot manage their child’s care, adhere to treatment or avoid poor child health outcomes if they have a poor understanding of their child’s health status or condition. Self-efficacy in communication likely influences this process. Certainly, adequate explanatory communication is needed so that a mother can achieve the necessary skills to adhere to well-child guidelines or manage acute childhood illness. Our study underscores the role that self-efficacy in communication plays in the elucidative and explanatory interactions between low-income Latina mothers and their child’s HCP.

**Limitations**

Although our study adds important findings to the literature regarding the relationships between maternal HL, self-efficacy and mother-provider interpersonal interaction, the study has a number of limitations. We used a cross-sectional study design and as a result, we cannot draw definitive conclusions regarding causal relationships among the variables examined. Further, these findings may not be generalizable to all low-income Latina mothers of young children. Our sample population comprises mothers receiving WIC benefits, which is a form of support, which may or may not have been captured in our data. Further, that these mothers received WIC benefits at the time of this study could indicate they possess greater knowledge about available resources and more confidence about obtaining those resources. Thus, our data may not reflect those who do not receive this benefit. Our data may also be subject to recall bias as we used self-
reported information. In addition, our findings do not reflect the duration of the maternal relationship with the HCP or specific attributes of the HCP, both of which can influence parent-provider communicative interaction. Nonetheless, our study provides insights into the relationships between maternal HL, self-efficacy, social support and interpersonal process of care in low-income Latina mothers, heretofore, previously unexamined. Importantly, additional research is needed to better understand these complex relationships, particularly those between the specific dimensions of the interpersonal processes of care. Understanding how “elicitation-type communication” and “explanatory-type communication” interact with and influence other interpersonal processes of care is essential for improving information exchange between a mother and her child’s HCP. Moreover, interventions that focus on improving maternal self-efficacy in interacting with HCPs and the health care system, while building on maternal HL and existing sources of social support, may have a better impact on pediatric health outcomes than interventions that focus solely on improving HL alone.
References


Table 5-1. Participant Characteristics, $n = 124^a$

<table>
<thead>
<tr>
<th></th>
<th>Mean / $n$ ± SD / Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Age (years)</td>
<td></td>
</tr>
<tr>
<td>≤ 24</td>
<td>25 (20.2%)</td>
</tr>
<tr>
<td>25 to 34</td>
<td>61 (49.2%)</td>
</tr>
<tr>
<td>≥ 35</td>
<td>22 (17.7%)</td>
</tr>
<tr>
<td>Child Age (months)</td>
<td></td>
</tr>
<tr>
<td>3 to 9</td>
<td>18 (14.5%)</td>
</tr>
<tr>
<td>10 to 18</td>
<td>28 (22.6%)</td>
</tr>
<tr>
<td>19 to 48</td>
<td>78 (14.5%)</td>
</tr>
<tr>
<td>Child Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>67 (54%)</td>
</tr>
<tr>
<td>Female</td>
<td>54 (43.5%)</td>
</tr>
<tr>
<td>Number of children</td>
<td>2.62 (1.36)</td>
</tr>
<tr>
<td>Adults at home</td>
<td>2.7 (1.3)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Completed high school</td>
<td>76 (61.3%)</td>
</tr>
<tr>
<td>Less than high school</td>
<td>46 (37.1%)</td>
</tr>
<tr>
<td>Child Health Insurance</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>120 (96.8%)</td>
</tr>
<tr>
<td>No</td>
<td>4 (3.2%)</td>
</tr>
<tr>
<td>Type of Health Insurance</td>
<td></td>
</tr>
<tr>
<td>Medicaid$^b$</td>
<td>77 (62.1%)</td>
</tr>
<tr>
<td>CHIP$^c$</td>
<td>26 (21%)</td>
</tr>
<tr>
<td>Other</td>
<td>17 (13.7%)</td>
</tr>
<tr>
<td>Regular Place for Care</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>116 (93.5%)</td>
</tr>
<tr>
<td>No</td>
<td>7 (5.6%)</td>
</tr>
<tr>
<td>Same Provider for Care</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>112 (90.3%)</td>
</tr>
<tr>
<td>No</td>
<td>10 (8.1%)</td>
</tr>
<tr>
<td>Maternal Years in U.S.</td>
<td>14.32 (8.01)</td>
</tr>
<tr>
<td>Maternal Birthplace</td>
<td></td>
</tr>
<tr>
<td>U.S.</td>
<td>57 (46%)</td>
</tr>
<tr>
<td>Mexico</td>
<td>55 (44.4%)</td>
</tr>
<tr>
<td>Other</td>
<td>7 (5.6%)</td>
</tr>
</tbody>
</table>

$^a$ Missing data: maternal age, $n = 16$ (12.9%); child gender, $n = 3$ (2.4%); education, $n = 2$ (1.6%); type of health insurance, $n = 4$ (3.2%); regular place of care, $n = 1$ (0.8%); same provider of care, $n = 2$ (1.6%); years in U.S., $n = 62$ (50%); maternal birthplace, $n = 5$ (4%)

$^b$ Medicaid in California is referred to as Medi-Cal; $^c$ CHIP is the federal Children’s Health Insurance Program
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Communication</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lack of clarity $^b$</td>
<td>2.47 (0.77)</td>
</tr>
<tr>
<td></td>
<td>Elicited concerns, responded</td>
<td>4.04 (0.94)</td>
</tr>
<tr>
<td></td>
<td>Explained results</td>
<td>4.02 (1.16)</td>
</tr>
<tr>
<td><strong>Decision Making</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worked together</td>
<td>3.55 (1.17)</td>
</tr>
<tr>
<td><strong>Interpersonal Style</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compassionate, respectful</td>
<td>4.14 (0.79)</td>
</tr>
<tr>
<td></td>
<td>Discriminated due to race/ethnicity $^b$</td>
<td>1.50 (0.84)</td>
</tr>
<tr>
<td></td>
<td>Disrespectful office staff $^b$</td>
<td>1.64 (0.93)</td>
</tr>
</tbody>
</table>

$^a$ Missing data: Discriminated due to race/ethnicity, $n = 1$; Disrespectful office staff, $n = 2$

$^b$ High score indicates worse process
Table 5-3. Correlations among Demographic Variables, Maternal HL and Social Support

<table>
<thead>
<tr>
<th></th>
<th>Maternal Age</th>
<th>Child Age in Mos.</th>
<th>Children in Home</th>
<th>Adults in Home</th>
<th>Maternal HL</th>
<th>Accult./Lang.Use</th>
<th>Informal Support</th>
<th>Formal Support</th>
<th>Total Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Age</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child Age in Mos.</td>
<td>.206* (.038)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children in Home</td>
<td>.478** (.000)</td>
<td>.077 (.412)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults in Home</td>
<td>.020 (.838)</td>
<td>.072 (.443)</td>
<td>-.008 (.929)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal HL</td>
<td>-.102 (.293)</td>
<td>.004 (.969)</td>
<td>-.251** (.005)</td>
<td>-.128 (.159)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acculturation / Lang. Use</td>
<td>-.389** (&lt;.001)</td>
<td>.033 (.724)</td>
<td>-.192* (.035)</td>
<td>-.041 (.653)</td>
<td>.312** (&lt;.001)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informal Support</td>
<td>.015 (.880)</td>
<td>.053 (.567)</td>
<td>.091 (.319)</td>
<td>.158 (.083)</td>
<td>-.040 (.659)</td>
<td>.060 (.&lt;.001)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal Support</td>
<td>.157 (.105)</td>
<td>.052 (.579)</td>
<td>-.026 (.776)</td>
<td>.065 (.479)</td>
<td>-.167 (.063)</td>
<td>.069 (.451)</td>
<td>.597** (&lt;.001)</td>
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<td></td>
</tr>
<tr>
<td>Total Support</td>
<td>.058 (.554)</td>
<td>.057 (.538)</td>
<td>.065 (.472)</td>
<td>.145 (.112)</td>
<td>-.080 (.379)</td>
<td>.029 (.753)</td>
<td>.974** (&lt;.001)</td>
<td>.764** (&lt;.001)</td>
<td>1</td>
</tr>
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</table>

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
* Subscales of Total Support
Table 5-4. Correlations among Maternal HL, Social Support, Self-Efficacy, and Interpersonal Processes of Care

<table>
<thead>
<tr>
<th>Maternal HL</th>
<th>Self-Efficacy</th>
<th>Informal Support&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Formal Support&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Total Support</th>
<th>Lack of Clarity&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Elicits Concerns</th>
<th>Explains Results</th>
<th>Work Together</th>
<th>Compass./Respect</th>
<th>Discrim./Race/Ethn.&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Disrespect./Office Staff&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal HL</td>
<td>.160</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informal Support&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-0.40</td>
<td>.180*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal Support&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-0.167</td>
<td>.151</td>
<td>.597**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Support</td>
<td>-0.080</td>
<td>.187*</td>
<td>.974**</td>
<td>.764**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of Clarity&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-0.151</td>
<td>-0.149</td>
<td>.083</td>
<td>.009</td>
<td>.069</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elicits Concerns</td>
<td>.154</td>
<td>.245**</td>
<td>.142</td>
<td>.026</td>
<td>.121</td>
<td>-0.181*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explains Results</td>
<td>.109</td>
<td>.154</td>
<td>.086</td>
<td>-0.014</td>
<td>.065</td>
<td>-0.213*</td>
<td>.569**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work Together</td>
<td>.089</td>
<td>.076</td>
<td>.021</td>
<td>.048</td>
<td>.031</td>
<td>-.067</td>
<td>.444**</td>
<td>.629**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compass./Respect</td>
<td>.073</td>
<td>.083</td>
<td>.116</td>
<td>.075</td>
<td>.115</td>
<td>-1.156</td>
<td>.635**</td>
<td>.530**</td>
<td>.657**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Discrim./Race/Ethn.&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-.207*</td>
<td>-.032</td>
<td>.112</td>
<td>-.077</td>
<td>.068</td>
<td>.230*</td>
<td>-.249**</td>
<td>-.216*</td>
<td>-.100</td>
<td>-.246**</td>
<td>1</td>
</tr>
<tr>
<td>Disrespect./Office Staff&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-.008</td>
<td>-.124</td>
<td>.093</td>
<td>.082</td>
<td>.098</td>
<td>.205*</td>
<td>-.259**</td>
<td>-.235**</td>
<td>-.169</td>
<td>-.161</td>
<td>.455**</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
<sup>a</sup> Subscale of Total Support; <sup>b</sup> High scores indicate worse process for this domain
Table 5-5. Regression Analyses

5-5a. Maternal HL and “Discriminated Race/Ethnicity”

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>t</th>
<th>Sig.</th>
<th>95% CI</th>
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<tbody>
<tr>
<td>Constant</td>
<td>1.452</td>
<td>.394</td>
<td>3.684</td>
<td>3.684</td>
<td>.000</td>
<td>.670</td>
</tr>
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<td>Maternal Age</td>
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<td>.012</td>
<td>.062</td>
<td>.006</td>
<td>.995</td>
<td>-.023</td>
</tr>
<tr>
<td>No. of children</td>
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<td>.060</td>
<td>.062</td>
<td>.542</td>
<td>.589</td>
<td>-.087</td>
</tr>
<tr>
<td>Acculturation</td>
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<td>-.067</td>
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<td>.554</td>
<td>-.148</td>
</tr>
<tr>
<td>Maternal HL</td>
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<td>-.065</td>
<td>-.603</td>
<td>.548</td>
<td>-.113</td>
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</table>

Model: $R^2 = .019, p = .753$

5-5b. Informal Support and Maternal Self-Efficacy

<table>
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<th></th>
<th>B</th>
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<th>β</th>
<th>t</th>
<th>Sig.</th>
<th>95% CI</th>
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<td>13.317</td>
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<tr>
<td>Maternal Age</td>
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<td>.225</td>
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<td>-.006</td>
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<tr>
<td>No. of children</td>
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Model: $R^2 = .139, p = .009$

5-5c. Maternal Self-Efficacy and “Elicits Concerns”

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<th>β</th>
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Model: $R^2 = .145, p = .007$
Manuscript 3
Health Literacy and Interpersonal Interactions as Predictors of Maternal Perception of Ambulatory Care for Low-Income, Latino Children

Abstract

Objective. Low maternal health literacy (HL) coupled with poor interpersonal interactions with health care providers (HCPs) may impede verbal and written communication and interfere with the development of high-quality parent-provider relationships resulting in suboptimal pediatric health care and decreased perception of quality of care.

Methods. This cross-sectional study of low-income Latina mothers and female caregivers of children 3 months to 4 years examined the associations between maternal HL and maternal-provider interpersonal processes, and their respective influence on maternal perception of the quality of pediatric ambulatory services received. Predictor variables included maternal HL, measured with the Newest Vital Sign, and perception of interpersonal interactions with HCPs, assessed using the Interpersonal Processes of Care in Diverse Populations (IPC) survey. Maternal perception of quality of pediatric ambulatory care was measured using four subscales of the Promoting Health Development Survey (PHDS): (1) anticipatory guidance, (2) family-centered care, (3) helpfulness of care provided, and (4) assessment of family well-being.

Results. In adjusted hierarchical regression models, IPC domains “lack of clarity” (β = -.225, 95% CI -13.998, -1.960, p = .01) and “explained results,” (β = .344, 95% CI 3.480, 13.010, p = .001) predicted maternal perception of the quality of “anticipatory guidance,” as did “worked together” (β = .430, 95% CI 6.211, 14.143, p <
“compassion/respect” (β = .302, 95% CI 4.631, 16.165, p = .001) and “disrespectful staff” (β = - .325, 95% CI -14.887, -4.144, p = .001). Perception of “family centered care” was predicted by “explained results” (β = .422, 95% CI 5.700, 14.089, p < .001), “worked together” (β = .441, 95% CI 6.657, 13.624, p < .001) and maternal HL (β = -.301, 95% CI -7.161, -2.263, p < .001); and “compassion/respect” (β = .368, 95% CI 7.363, 17.935, p < .001) and “disrespectful staff” (β = -.256, 95% CI -12.783, -2.684, p = .003). “Helpfulness of care” was predicted by MHL (β = -.215, 95% CI -4.797, -.393, p = .021), and “explained results” (β = .335, 95% CI 2.563, 10.725, p = .002); “worked together” (β = .463, 95% CI 5.372, 11.675, p < .001); and MHL (β = -.234, 95% CI -5.030, -609, p = .013) and “compassion/respect” (β = .368, 95% CI 5.070, 14.486, p < .001). “Explain results” predicted “assessment of family well-being” (β = .302, 95% CI 2.239, 12.992, p = .006); as did “worked together” (β = .295, 95% CI 3.111, 11.508, p = .001).

**Conclusions.** Maternal perception of provider communication, decision-making processes and interpersonal style explained a significant amount of the variance in each of the quality of care outcome variables. This data confirms the substantial role that interpersonal processes play in the mother-provider health care exchange. Speaking with clarity, explaining results fully and working with a parent to determine a child’s plan of care is most predictive of whether a mother or female care giver feels that her child is receiving quality ambulatory care services.

**Introduction**

Positive child health outcomes result from effective communication between a parent and their child’s health care provider (HCP) (Nobile Hart et al., 2007). Effective
communication encourages trust in the therapeutic relationship, improves parental satisfaction with care, promotes adherence to health care regimens and increases parental disclosure of psychosocial concerns (Nobile Hart et al., 2007; Rosenthal, Socolar, DeWalt, Pignone, Garrett, et al., 2007). Evidence indicates however, that parent-provider communication, particularly within the context of pediatric ambulatory care, may not be ideal (Agency for Healthcare Research and Quality, 2002; Centers for Disease Control & National Center for Health Statistics, 2008). Parents with limited education and economic means, who are members of racial or ethnic minority groups, and who possess inadequate language proficiency or do not speak English are at substantial risk for poor communication with providers (Bloom et al., 2011; Nobile Hart et al., 2007).

Past research reveals that one’s level of health literacy (HL), or literacy within the health care context, can substantially influence the participatory dimensions of the patient-provider relationship, shape patient decision-making and affect involvement in their care (Ishikawa et al., 2009; Schillinger et al., 2004; Schillinger et al., 2003). Accordingly, low HL may impact a parent’s engagement with information sources or alter their information exchange, which may decrease their ability to participate in shared decision making and negatively influence parent and HCP interaction (Edwards, Davies, & Edwards, 2009). As a result, limited parental HL may potentially impede informed parental decision-making, disrupt access to pediatric health care, and exacerbate pediatric health disparities (Yin et al., 2009). Yet, a large proportion of HCPs have not routinely incorporated appropriate methods for communicating with low health literate patients or parents into their practice (Schlichting et al., 2007; Schwartzberg et al., 2007).
Communication is reciprocal and as such, patient and HCP perceptions or actions likely play a vital role in health care exchanges (J. B. Brown et al., 2003). Comprehensible child health information is vital to any parent. Notably, a HCP’s interaction with a parent may influence her perceptions and subsequent decisions as much as any information, written or oral, conveyed. However, little is known about the process of parent-provider information exchange or its effect on decision-making among or parents with limited HL (Edwards et al., 2009). Moreover, although women frequently play an active role in medical decision-making for their families (Arora & McHorney, 2000), current models of shared decision making may not hold true for the mother with limited HL (Johnston Polacek, Ramos, & Ferrer, 2007). Socially and economically disadvantaged women are at particular risk for limited participation in shared decision-making, and they often express decision dissatisfaction regarding their own medical care. (Govender & Penn-Kekana, 2008; Hawley et al., 2008) However, whether this applies to health care for their children is not well described.

Low maternal HL coupled with poor interpersonal interactions with HCPs may impede verbal and written communication and interfere with the development of high-quality parent-provider relationships resulting in suboptimal pediatric health care. This cross-sectional study examined the associations between maternal HL and maternal-provider interpersonal processes, and their respective influence on maternal perception of the quality of pediatric ambulatory services received. Specifically, we hypothesized that maternal HL and maternal-provider interpersonal interactions are significantly associated with and predictive of maternal perception of quality of primary pediatric ambulatory care received, when controlling for statistically significant demographic characteristics.
Methods

Participants

Low-income Latina English- or Spanish-speaking mothers or female primary care givers of children aged 3 to 48 months who sought ambulatory health care for their child within the last six months were recruited from five different WIC clinics in inland southern California during August and September 2011. Receipt of WIC benefits, income eligibility for which is set in California at 185% of the federal poverty limit, served as the proxy measure for income status. Mothers or female primary care givers who were not low-income English- or Spanish-speaking Latinas were excluded from this study. Additional exclusion criteria included not using ambulatory care services for her child within the last six months, if the child was less than 3 months or greater than 48 months of age, or if the child experienced chronic illness defined as having a health problem lasting over three months, which affected the child’s normal activities, and required hospitalizations, home health care and/or extensive medical care (Cohen et al., 2011). Finally, due to general or culturally defined gender differences in parenting roles and other characteristics that may influence interpersonal processes, fathers or male primary care givers were also excluded from this study. The University of California, Los Angeles Institutional Review Board approved this study.

Procedure

Flyers describing the study and listing recruitment dates were posted in the respective WIC clinics. An English-speaking principal investigator and two bicultural, bilingual research assistants interviewed interested mothers and caregivers in their preferred language to determine eligibility. Once deemed eligible, the participant was
informed of her rights as a human subject and her consent to participate was obtained. Participants were assessed for level of HL and asked to complete a demographic questionnaire and surveys to assess interpersonal interactions and quality of pediatric ambulatory care services. Participants could elect to have the surveys read by a researcher to accommodate limited literacy. The entire encounter lasted approximately 30 to 45 minutes and participants received a $20 gift card to a local grocery-retail store for completing the study.

**Outcome Measure**

The standardized, well-validated parent survey, *Promoting Health Development Survey* (PHDS), available in English and Spanish, was used to measure the primary outcome variable, maternal perception of quality of pediatric ambulatory care received (Bethell, Peck, & Schor, 2001a; Foundation for Accountability, 2000). Importantly, the PHDS is not a satisfaction survey; rather, the purpose of the PHDS is to assess whether clinically recommended age-specific preventive and developmental services were provided within the context of the health care encounter (The Child and Adolescent Health Measurement Initiative, 2011). The PHDS was specifically designed to measure the communication-dependent and relationship-centered aspects of care that are not adequately represented by medical chart review or claims and billing data and for which the parent is the most valid and reliable source of information. Widely used among families representing a range of racial, income and education levels (The Child and Adolescent Health Measurement Initiative, 2011), the PHDS has been endorsed by the National Quality Forum as a valid measure for system, plan and provider-level
assessment of parents’ experiences with pediatric preventive and developmental health care.

We used four subscales of a shortened version of the PHDS that reflect parent-provider communication: (1) anticipatory guidance, (2) family-centered care, (3) helpfulness of care provided, and (4) assessment of family well-being, which includes assessment of psychosocial and substance use risk factors. Domain scores were obtained either as a mean score on a multi-item scale (anticipatory guidance, family-centered care, and helpfulness of information provided) or as average proportion based on affirmative responses (assessment of family well-being) converted to a 0-100 point scale (Bethell, Peck, & Schor, 2001b; Foundation for Accountability, 2000) (Table 5-6).

**Predictor Variables**

**Demographics.** Demographic data obtained included participant’s age, level of education, number of children and adults in home, child health insurance status, whether the child receives care from a regular place and regular HCP, family living arrangements and presence of social support. In addition, language preference and use was addressed by measuring participant level of acculturation using the valid and reliable *Short Acculturation Scale for Hispanics* (Edelman et al., 2009; Marin et al., 1987). Specifically, participants answered the following language frequency questions: “what language(s) do you read and speak?”, “what language(s) do you usually speak at home?”, “in which language(s) do you usually think?”, “what language(s) do you usually speak with your friends.” Given the high prevalence of immigrants in our region, we added a fifth question, “what language(s) did you use as a child?” Responses are based on a 5-point Likert scale (1=only Spanish, 2=Spanish more than English, 3=both equally,
4=English more than Spanish, 5= only English). Mean scores of less than 3 indicate a lower level of acculturation based on language preference (Edelman et al., 2009; Marin et al., 1987). Participants were also asked to report country of birth and number of years in United States. See Table 5-7 for participant demographic characteristics.

**Maternal Health Literacy.** Maternal HL was measured using the *Newest Vital Sign* (NVS) (Pfizer, 2012), a bilingual screening tool, which is based upon a nutrition label from an ice-cream container and asks six questions that assess an individual’s prose literacy, numeracy and document literacy. It can be administered within three to five minutes. Each correct answer is given one point. A score of 0 to 1 suggests a “high likelihood of low HL,” 2 to 3 suggests the “possibility of low HL,” while 4 to 6 generally indicates “adequate HL” (Weiss et al., 2005b). For the purposes of our analyses, we used HL as a continuous variable and calculated a mean score. Mothers and female caregivers in this study had a mean NVS score of 2.19 (SD = 1.73) distributed as follows: high likelihood of low HL (n = 53, 42.7%), possibility of low HL (n = 43, 34.6%) and adequate HL (n = 28, 22.6%).

**Interpersonal Processes of Care.** Maternal perception of interpersonal interactions with HCPs was measured using the English or Spanish version of the 18-item short form of the *Interpersonal Processes of Care in Diverse Populations* (IPC) survey, a comprehensive survey based upon a specific conceptual framework of interpersonal processes, that while designed for all segments of the population, incorporates specific issues of import to minority and low income groups (Stewart et al., 1999). The IPC does not measure a single, undifferentiated construct, but rather, distinguishes three domains of interpersonal interaction: communication, decision making, and interpersonal style,
each with one or more subscales (Stewart et al., 1999). As a result, the tool allows for assessment of distinct, albeit interrelated, aspects of the interpersonal processes of care. Questions ask participants about their experiences in talking with their HCP and generally begin with “How often did your provider …” with possible responses ranging from “1” (never) to “5” (always). Mean scores are calculated for each of the domains. Higher scores indicate higher frequency of the labeled interpersonal process such that in some cases, higher scores indicate better processes and in others, worse processes (Stewart et al., 2007). For example, high scores for “lack of clarity,” “discriminated due to race/ethnicity,” and “disrespectful office staff” indicate poor interpersonal process. Table 5-6 presents mean scores for each subscale for participants in this study.

Results

Simple bivariate analysis using Pearson’s correlation coefficient determined the associations between maternal HL, demographic predictor variables and the outcome variables (Table 5-8) and between the interpersonal processes predictors and the outcome variables (Table 5-9). We performed hierarchal regression analyses first entering related demographic variables that achieved bivariate significance of ≤ .10 with the respective outcome variable, followed by maternal HL (step 2), and the interpersonal interaction variables, entered together by domain (step 3). Criteria for entry and removal of variables was set at \( p \leq .05 \) and \( p \geq .10 \). We did not include child health insurance, usual provider and place of care in any of the models given the lack of variability in maternal response to those questions. In addition, we excluded years in the U.S. due to the high number of non-responses to that question. Further, because education and literacy are causally related making interpretation of the model more difficult, we did not include education
level in the models (D. A. DeWalt & Pignone, 2005; Rosenthal, Socolar, DeWalt, Pignone, Garrett, et al., 2007; von Wagner et al., 2009). We conducted the analyses using SPSS 19.0 (SPSS Inc., Chicago, IL).

**Maternal HL**

Maternal HL was inversely related to the interpersonal interaction subscale, “discrimination due to race/ethnicity” (where increasing scores signal worse process), $r = -0.207, p = .021$ indicating that as HL scores increase perception of discrimination lessens. In addition, trending toward significance were maternal HL and “lack of clarity” (also where increasing scores signal worse process), $r = -0.151, p = .095$; and “elicit concerns,” $r = 0.154, p = .088$. Significant inverse correlations were also noted between maternal HL and the outcome variables, “family-centered care,” $r = -0.202, p = .038$, and “assessment of family well-being,” $r = -0.189, p = .036$, indicating that as maternal HL scores increase, the maternal perception of the quality care for each of these measures diminishes. Finally, an inverse relationship between maternal HL and “anticipatory guidance” also moved towards significance, $r = -0.153, p = .090$.

**Interpersonal Processes of Care and Perceived Quality of Care**

**Anticipatory Guidance.** Hierarchical multiple regression analyses revealed that after controlling for adults at home, child age, and maternal HL, the interpersonal process communication domain significantly predicted maternal perception of the quality of “anticipatory guidance.” Specifically, in the second model testing the relationship between the demographic variables, maternal HL and “anticipatory guidance,” maternal HL did not contribute significantly to the model, $R = .276, R^2 = .076, F(3, 112) = 3.083, p = .03$, $R^2_{change} = .029 (F_{change}(1, 112) = 3.493, p = .064)$ suggesting that maternal HL
explains very little unique variance with regard to perceived quality of anticipatory guidance. The addition of three subscales for the interpersonal communication domain however, significantly improved the explanatory power of the final model, $R = .532, R^2 = .283, F(6, 109) = 7.185, p \leq .001$, with $R^2_{\text{change}} = .207 (F_{\text{change}}(3, 109) = 10.503, p \leq .001)$. Notably, in this model, the significant predictors were number of adults at home, the level of maternal HL, “lack of clarity” and “explained results” (Table 5-10a).

For the interpersonal process decision-making domain, “worked together” increased the variance in “anticipatory guidance” by 17.5%, $R = .501, R^2 = .251, F(4, 111) = 9.289, p \leq .001$, with $R^2_{\text{change}} = .175 (F_{\text{change}}(1, 111) = 25.855, p \leq .001)$. Here, only maternal HL and “worked together” significantly predicted “anticipatory guidance” (Table 5-10b). Finally, in a third model, the three subscales for the interpersonal style domain explained nearly 24% of the variance in the outcome variable, $R = .557, R^2 = .310, F(6, 107) = 8.030, p \leq .001$, with $R^2_{\text{change}} = .239 (F_{\text{change}}(3, 107) = 12.384, p \leq .001)$. Specifically, maternal HL, “compassion/respect” and “disrespectful staff” were the significant predictors (Table 5-10c).

**Family Centered Care.** The number of children at home minimally predicted maternal perception of “family centered care,” $R = .234, R^2 = .055, F(1, 120) = 6.967, p = .009$. Adding maternal HL again only slightly improved the model, $R = .353, R^2 = .124, F(2, 119) = 8.454, p \leq .001$, with $R^2_{\text{change}} = .070 (F_{\text{change}}(1, 119) = 9.451, p = .003)$; however, the addition of the communication subscales improved the model by explaining 24.4% of the variance in perception of “family centered care,” $R = .607, R^2 = .369, F(5, 116) = 13.540, p \leq .001$, with $R^2_{\text{change}} = .244 (F_{\text{change}}(1, 118) = 14.948, p \leq .001)$. Number of children, maternal HL, and “explained results” were the significant predictors (Table
A second model, including the “worked together” decision-making domain, in addition to number of children and maternal HL also improved the explanatory power of the model, \( R = .563, R^2 = .317, F(3, 118) = 18.242, p \leq .001, \) with \( R^2_{\text{change}} = .192 \) (\( F_{\text{change}}(1, 118) = 33.237, p \leq .001 \)) (Table 5-11b). Finally, a third model including the three interpersonal style subscales uniquely explained 21.8% of the variance beyond step 2, \( R = .593, R^2 = .351, F(5, 114) = 12.355, p \leq .001, \) with \( R^2_{\text{change}} = .218 \) (\( F_{\text{change}}(3, 114) = 12.789, p \leq .001 \)). Again, maternal HL, “compassion/respect” and “disrespectful staff” remained significant predictors (Table 5-11c).

**Helpfulness of Care.** Only the third, full communication domain model which included number of children at home, maternal HL and the three subscales was significantly predictive of “helpfulness of care,” with the communication domain exclusively explaining 18.8% of the variance, \( R = .493, R^2 = .243, F(5, 99) = 6.353, p \leq .001, \) with \( R^2_{\text{change}} = .188 \) (\( F_{\text{change}}(3, 99) = 8.201, p \leq .001 \)). The significant predictors were number of children, maternal HL and “explained results” (Table 5-12a). In the second model, at step 3, “worked together” singularly contributed 21% beyond the prior steps, \( R = .514, R^2 = .264, F(3, 101) = 12.104, p \leq .001, \) with \( R^2_{\text{change}} = .210 \) (\( F_{\text{change}}(1, 101) = 28.703, p \leq .001 \)) and all three predictor variables entered into this model remained significant predictors (Table 5-12b). Lastly, the three interpersonal style predictors explained 27.2% of the variance in “helpfulness of care,” in a final third model, \( R = .522, R^2 = .272, F(5, 97) = 7.250, p \leq .001, \) with \( R^2_{\text{change}} = .210 \) (\( F_{\text{change}}(3, 97) = 9.314, p \leq .001 \)), with maternal HL and “compassion/respect” as the significant predictors of care (Table 5-12c).
Assessment of Family Well-being. Level of maternal acculturation was minimally predictive of maternal perception of the quality of the “assessment of family well-being” by HCPs, $R = .241$, $R^2 = .058$, $F(1, 119) = 7.313$, $p = .008$. Adding maternal HL, did not significantly add to the model, $R = .267$, $R^2 = .071$, $F(2, 118) = 4.531$, $p = .013$, with $R^2_{change} = .013$ ($F_{change}(1,118) = 1.706$, $p = .194$), and while the full model remained significant, $R = .371$, $R^2 = .138$, $F(3, 115) = 3.676$, $p = .004$, the communication domains added little unique explanatory power to the model, $R^2_{change} = .066$ ($F_{change}(3, 115) = 2.956$, $p = .035$). Maternal acculturation and “explain results” were the only significant predictors in this final model (Table 5-13a).

The decision-making domain of “worked together” was again significant at step 3, $R = .396$, $R^2 = .157$, $F(3, 117) = 7.262$, $p \leq .001$, but it uniquely contributed only about 11.8% to the variance for “assessment of well-being,” $R^2_{change} = .086$ ($F_{change}(1, 117) = 11.888$, $p \leq .001$) with maternal acculturation and “worked together” remaining significant predictors in the model (Table 5-13b). Lastly, while the model that included the interpersonal style domains reached statistical significance, $R = .331$, $R^2 = .110$, $F(5, 113) = 2.781$, $p = .021$, the addition of the three subscales did not significantly add to the model, $R^2_{change} = .038$ ($F_{change}(3, 113) = 1.616$, $p = .190$). In fact, only maternal acculturation remained predictive of “assessment of well-being” (Table 5-13c).

Discussion

Effective communication between a parent and their child’s health care provider (HCP) significantly predicts maternal perception of the quality of pediatric ambulatory health care. Importantly, maternal HL appears to be related to the successful transmission of anticipatory guidance, the delivery of family centered care and the
helpfulness of information provided, but assessing maternal HL in combination with relevant demographic factors and specific interpersonal interaction domains reveals a complex picture.

Consistent with previous studies, we noted that maternal HL was significantly associated with acculturation with less acculturated mothers possessing lower levels of HL. In addition, we noted inverse relationships between maternal HL and perception of quality of care. As maternal HL increased, perception of the quality of care decreased confirming similar findings by others (Rosenthal, Socolar, DeWalt, Pignone, Garret, et al., 2007). This may reflect lower expectations for care by mothers with low HL. Low HL may also contribute to feelings of marginalization and decreased inclination to complain (Baker et al., 1996). Moreover, given our findings of a strong relationship between maternal HL and maternal acculturation, language proficiency, cultural beliefs and immigration status (which was not measured here) may play some role in maternal perception of care.

Notably, when hierarchical regression was used, we found that maternal HL contributed far less to the outcome variables than anticipated. Instead, maternal perception of provider communication, decision-making processes and interpersonal style explained a significant amount of the variance in each of the quality of care outcome variables. Maternal HL may be a more dynamic and multifaceted concept than previously understood. In this context, it appears to be associated with various demographic variables such as having access to another adult at home, or child rearing experience as measured by the child’s age or number of children in the home, each of which likely influences the functional skills associated with maternal HL. Consequently,
maternal HL itself did not substantially contribute in predicting maternal perception of quality of care in this study. Further, the association of maternal HL with certain demographic characteristics suggests that efforts only focused on increasing functional maternal HL, such as increasing the readability of materials, may not necessarily improve perception of the quality pediatric health care received.

Importantly, our data confirm the substantial role that interpersonal processes play in the mother-provider health care exchange, particularly among low-income populations (Sudore et al., 2009). Specifically, speaking with clarity, explaining results fully and working with a parent to determine a child’s plan of care appear to be most predictive of whether a mother or female care giver feels that her child is receiving quality ambulatory care services. Moreover, treating a mother and her child with compassion and respect appears to contribute greatly to the health care exchange. Finally, our study revealed the important role that provider office staff can have in promoting family centered care. Frequently, these front-line individuals serve as the conduit between the mother and the HCP and are often the first contact that a mother has with a particular clinic or HCP. Others have noted that office staff behavior plays a particularly important role in older patients’ perceptions of service quality (Brand, Cronin, & Routledge, 1997) and poor service delivery from office staff has been cited as a barrier to care and a priority for action for improving the quality of health care for low-income and minority populations (Gaston-Johansson, Hill-Briggs, Oguntomilade, Bradley, & Mason, 2007).

While, to our knowledge, this study is the first investigation to simultaneously examine the relationships between maternal HL, mother-provider interpersonal interaction and maternal perception of quality of pediatric ambulatory care, this study
does have a number of limitations. As a cross-sectional study, we cannot infer causality from any of our findings. Further, these findings may not be generalizable to all low-income Latina mothers of young children. The sample population comprises mothers receiving WIC benefits who may be “connected” to resources in ways that others, particularly low-income undocumented mothers, are not. This is reflected in the high rate of insured children and use of consistent HCPs noted among this population. Moreover, recall bias have been a factor as we used self-reported information. In addition, we did not collect data on the duration of the maternal relationship with the HCP or specific attributes of the HCP. Nevertheless, our study confirms that interpersonal interaction is an important factor in providing quality ambulatory health care to children. These analyses lend support to the continuing exploration of the relationship between maternal HL and parent-provider communication and their impact on pediatric health outcomes.

**Implications for Practice and Conclusion**

A great deal of the recent quality improvement efforts aimed at populations at risk for low HL have focused on simplifying and clarifying written health information. While these efforts certainly benefit all patient groups, HCPs must understand that these interventions may not be sufficient to improve health outcomes (M. S. Wolf et al., 2007). Comprehensive efforts are needed that target both parent and provider communicative interaction. At present such efforts have focused on developing chronic disease self-management programs but their importance to ambulatory care cannot be underestimated, particularly for the pediatric population where health care encounters generally occur in regard to well child care or short-term acute illness. Pediatric providers must focus on improving their interpersonal interaction skills, with attention to those skill sets that are
most useful for communicating with mothers of low education or socio-economic status, those at risk for low HL, and those for whom English is not their first language. Treating every patient/family member as though they may have limited HL, known as “universal precautions” in communication, is an important first step (D. DeWalt et al., 2011). For example, the Partnership for Clear Health Communication encourages HCPs to use plain language, sit down to achieve eye-level with a patient while talking, break information down by speaking in short sentences, use visual models and pictures to explain a condition or procedure, minimize interruptions while speaking with the patient, and create a safe environment where patients/family members feel comfortable asking questions and advocating for themselves (Pfizer, 2011). In addition, the Agency for Healthcare Research and Quality (AHRQ) promotes use of the Health Literacy Universal Precautions Toolkit, which provides adult and pediatric primary care practices methods to assess services for HL considerations, raise awareness of staff and implement strategies to minimize the impacts of low HL (Agency for Healthcare Research and Quality, 2011).

Importantly, HCPs should not underestimate the value of clearly communicating their respect and concern for the families for whom they care. Pediatric clinic or office staff require training in appropriate interpersonal interactions for a diverse populations as well as methods that support the delivery of culturally competent care. Towards this end, the National Initiative for Children’s Healthcare Quality (NICHQ) has developed a “change package,” based upon the Care Model for Child Health, which can be implemented in primary care organizations to improve the quality of pediatric health care in a culturally and linguistically sensitive way (National Initiative for Children’s
Healthcare Quality, 2005). Achieving a “patient-centered” model of pediatric health care depends upon altering parent-provider communication to the extent that each family can truly understand, process and act on health related information regardless of their level of HL and specific socio-demographic characteristics. (Holmes et al., 2007).
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communication in pediatric care: Implications and recommendations.

communication and parental satisfaction with care of children with psychosocial

contemporary health education and communication strategies into the 21st


Table 5-6. Mean Scores

**Promoting Health Development Mean Scores, \( n = 124 \)^a, (± SD)**

<table>
<thead>
<tr>
<th>Service</th>
<th>Mean (± SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticipatory guidance and parental education</td>
<td>74.65 (27.2)</td>
</tr>
<tr>
<td>Family centered care</td>
<td>58.01 (27.04)</td>
</tr>
<tr>
<td>Helpfulness of care</td>
<td>78.70 (21.58)</td>
</tr>
<tr>
<td>Assessment of family well-being</td>
<td>44.92 (29.03)</td>
</tr>
</tbody>
</table>

^a Missing data: Assessment of family well-being, \( n = 1 \); Family centered care, \( n = 1 \); Helpfulness of care provided, \( n = 18 \)

**Interpersonal Processes of Care Mean Scores, \( n = 124 \)^a, (± SD)**

**Communication**
- Lack of clarity^b\  2.47 (0.77)
- Elicited concerns, responded\  4.04 (0.94)
- Explained results\  4.02 (1.16)

**Decision Making**
- Worked together\  3.55 (1.17)

**Interpersonal Style**
- Compassionate, respectful\  4.14 (0.79)
- Discriminated due to race/ethnicity^b\  1.50 (0.84)
- Disrespectful office staff^b\  1.64 (0.93)

^a Missing data: Discriminated due to race/ethnicity, \( n = 1 \); Disrespectful office staff, \( n = 2 \)

^b High score indicates worse process
<table>
<thead>
<tr>
<th>Table 5-7. Participant Characteristics, $n = 124^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean or Percentage ($± SD$)</td>
</tr>
<tr>
<td>Maternal Age (years)</td>
</tr>
<tr>
<td>≤ 24</td>
</tr>
<tr>
<td>25 to 34</td>
</tr>
<tr>
<td>≥ 35</td>
</tr>
<tr>
<td>Child Age (months)</td>
</tr>
<tr>
<td>3 to 9</td>
</tr>
<tr>
<td>10 to 18</td>
</tr>
<tr>
<td>19 to 48</td>
</tr>
<tr>
<td>Child Gender</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Number of children</td>
</tr>
<tr>
<td>Adults at home</td>
</tr>
<tr>
<td>Education</td>
</tr>
<tr>
<td>Completed high school</td>
</tr>
<tr>
<td>Less than high school</td>
</tr>
<tr>
<td>Child Health Insurance</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Type of Health Insurance</td>
</tr>
<tr>
<td>Medicaid$^b$</td>
</tr>
<tr>
<td>CHIP$^c$</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Regular Place for Care</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Same Provider for Care</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Language Use/Acculturation$^d$</td>
</tr>
<tr>
<td>Maternal Years in U.S.</td>
</tr>
<tr>
<td>Maternal Birthplace</td>
</tr>
<tr>
<td>U.S.</td>
</tr>
<tr>
<td>Mexico</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

$a$ Missing data: maternal age, $n = 16$ (12.9%); child gender, $n = 3$ (2.4%); education, $n = 2$ (1.6%); type of health insurance, $n = 4$ (3.2%); regular place of care, $n = 1$ (0.8%); same provider of care, $n = 2$ (1.6%); years in U.S., $n = 62$ (50%); maternal birthplace, $n = 5$ (4%)

$^b$ Medicaid in California is referred to as Medi-Cal;

$^c$ CHIP is the federal Children’s Health Insurance Program;

$^d$ A mean score of < 3 generally indicates participant is less acculturated
Table 5-8. Correlations among Maternal HL, Demographic Predictors and Outcome Variables

<table>
<thead>
<tr>
<th>Maternal HL</th>
<th>Language Use/Accult.</th>
<th>Maternal Age</th>
<th>Child Age</th>
<th>Years in US</th>
<th>Number of Children</th>
<th>Adults at Home</th>
<th>Anticipatory Guidance</th>
<th>Family Centered Care</th>
<th>Helpfulness of Care</th>
<th>Assess. of Wellbeing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal HL</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language Use/Accult.</td>
<td>.312** (&lt; .001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal Age (yrs)</td>
<td>-.102 (.969)</td>
<td>-.389** (.724)</td>
<td>1</td>
<td>.293 (.03)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child Age (mos)</td>
<td>.004 (.477)</td>
<td>.033 (.003)</td>
<td>.206* (.293)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years in US</td>
<td>-.092 (.477)</td>
<td>.369** (.003)</td>
<td>.350** (.293)</td>
<td>.138 (.293)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of children</td>
<td>-.251** (.005)</td>
<td>-.192* (.035)</td>
<td>.478** (.412)</td>
<td>.077 (.412)</td>
<td>.483** (.412)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults at home</td>
<td>-.128 (.159)</td>
<td>-.041 (.653)</td>
<td>.020 (.443)</td>
<td>.020 (.971)</td>
<td>.005 (.971)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anticipatory Guidance</td>
<td>-.153 (.900)</td>
<td>.002 (.981)</td>
<td>.091 (.347)</td>
<td>-.180 (.051)</td>
<td>.221 (.084)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Centered Care</td>
<td>-.320** (&lt; .001)</td>
<td>-.126 (.167)</td>
<td>.011 (.913)</td>
<td>-.075 (.418)</td>
<td>.020 (.880)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helpfulness of Care</td>
<td>-.202* (.038)</td>
<td>-.150 (.128)</td>
<td>.047 (.530)</td>
<td>.020 (.746)</td>
<td>.166 (.091)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Assess Family Wellbeing</td>
<td>-.189* (.036)</td>
<td>-.241** (.008)</td>
<td>-.133 (.221)</td>
<td>-.114 (.736)</td>
<td>.044 (.971)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Correlation is significant at the p = .01 level (two-tailed)
* Correlation is significant at the p = .05 level (two-tailed)
Table 5-9. Correlations among Maternal Health Literacy and Interpersonal Processes of Care and Ambulatory Care Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Maternal HL</th>
<th>Lack of Clarity*</th>
<th>Elicit Concerns*</th>
<th>Explained Results*</th>
<th>Worked Together*</th>
<th>Compass/Respect*</th>
<th>Discrim. Race*</th>
<th>Disrespect. Office*</th>
<th>Anticipatory Guidance</th>
<th>Family Centered Care</th>
<th>Helpfulness of Care</th>
<th>Assess Well-being</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal HL</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of Clarity</td>
<td>-.151 (.095)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elicit Concerns</td>
<td>.154 (.088)</td>
<td>-.181* (.044)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explained Results</td>
<td>.109 (.227)</td>
<td>-.213* (.018)</td>
<td>.569** (.018)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worked Together</td>
<td>.089 (.328)</td>
<td>-.067 (.463)</td>
<td>.444* (.018)</td>
<td>.629** (.018)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compass/Respect</td>
<td>.073 (.420)</td>
<td>-.156 (.084)</td>
<td>.635** (.001)</td>
<td>.530** (.001)</td>
<td>.657** (.001)</td>
<td>1</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Discrim. Race</td>
<td>-.207* (.021)</td>
<td>.230* (.010)</td>
<td>-.249* (.006)</td>
<td>-.216* (.016)</td>
<td>-.100 (.273)</td>
<td>-.246** (.006)</td>
<td>1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disrespect. Office</td>
<td>-.008 (.926)</td>
<td>.205* (.023)</td>
<td>-.259* (.004)</td>
<td>-.235** (.009)</td>
<td>-.169 (.063)</td>
<td>-.161 (.077)</td>
<td>.455** (.001)</td>
<td>1</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Anticipatory Guidance</td>
<td>-.153 (.090)</td>
<td>-.263** (.003)</td>
<td>.223* (.013)</td>
<td>.399** (.001)</td>
<td>.449** (.001)</td>
<td>.390** (.001)</td>
<td>-.191* (.034)</td>
<td>-.358** (.001)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Centered Care</td>
<td>-.320** (.146)</td>
<td>-.132 (.013)</td>
<td>.241** (.007)</td>
<td>.397** (.001)</td>
<td>.387** (.001)</td>
<td>.352** (.001)</td>
<td>-.097 (.286)</td>
<td>-.273** (.002)</td>
<td>.626** (.001)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helpfulness of Care</td>
<td>-.202* (.038)</td>
<td>-.142 (.146)</td>
<td>.242* (.013)</td>
<td>.344** (.001)</td>
<td>.416** (.001)</td>
<td>.376** (.001)</td>
<td>-.211* (.031)</td>
<td>-.218** (.026)</td>
<td>.771** (.001)</td>
<td>.699** (.001)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Assess Well-being</td>
<td>-.189* (.036)</td>
<td>.063 (.488)</td>
<td>.035 (.699)</td>
<td>.173 (.056)</td>
<td>.262** (.118)</td>
<td>.142 (.697)</td>
<td>-.036 (.308)</td>
<td>-.093 (.001)</td>
<td>.285** (.001)</td>
<td>.369** (.001)</td>
<td>.324** (.001)</td>
<td>1</td>
</tr>
</tbody>
</table>

* Correlation is significant at the p = .01 level (two-tailed)
* Correlation is significant at the p = .05 level (two-tailed)
Interpersonal Processes of Care: Communication subscales; Interpersonal Processes of Care: Decision making subscale; Interpersonal Processes of Care: Interpersonal style subscales
### Table 5-10a. Anticipatory Guidance and Communication Domains

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>Sig.</th>
<th>95.0% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>89.960</td>
<td>7.319</td>
<td>.000</td>
<td>75.460 - 104.460</td>
</tr>
<tr>
<td></td>
<td>Child age</td>
<td>-.327</td>
<td>.182</td>
<td>-.166</td>
<td>.075  -688 .033</td>
</tr>
<tr>
<td></td>
<td>Adults at home</td>
<td>-2.767</td>
<td>1.956</td>
<td>-.430</td>
<td>.160  -6.641 1.108</td>
</tr>
<tr>
<td>2</td>
<td>(Constant)</td>
<td>97.167</td>
<td>8.202</td>
<td>.000</td>
<td>80.915 - 113.419</td>
</tr>
<tr>
<td></td>
<td>Child age</td>
<td>-2.362</td>
<td>.180</td>
<td>-.166</td>
<td>.073  -683 .031</td>
</tr>
<tr>
<td></td>
<td>Adults at home</td>
<td>-3.224</td>
<td>1.950</td>
<td>-.452</td>
<td>.101  -7.087 .640</td>
</tr>
<tr>
<td></td>
<td>Maternal HL</td>
<td>-2.711</td>
<td>1.451</td>
<td>-.171</td>
<td>.064  -5.586 .163</td>
</tr>
<tr>
<td>3</td>
<td>(Constant)</td>
<td>83.518</td>
<td>15.692</td>
<td>.000</td>
<td>52.417 - 114.618</td>
</tr>
<tr>
<td></td>
<td>Child age</td>
<td>-2.535</td>
<td>.162</td>
<td>-.128</td>
<td>.122  -575 .068</td>
</tr>
<tr>
<td></td>
<td>Adults at home</td>
<td>-3.568</td>
<td>1.744</td>
<td>-.168</td>
<td>.043  -7.024 -.112</td>
</tr>
<tr>
<td></td>
<td>Maternal HL</td>
<td>-4.064</td>
<td>1.328</td>
<td>-.256</td>
<td>.003  -6.969 -1.433</td>
</tr>
<tr>
<td></td>
<td>Lack of clarity</td>
<td>-7.979</td>
<td>3.037</td>
<td>-.225</td>
<td>.010  -13.998 -1.960</td>
</tr>
<tr>
<td></td>
<td>Elicit concern</td>
<td>-2.855</td>
<td>3.024</td>
<td>.019</td>
<td>.852  -5.429 6.560</td>
</tr>
<tr>
<td></td>
<td>Explain results</td>
<td>8.245</td>
<td>2.404</td>
<td>.344</td>
<td>.001  3.480 13.010</td>
</tr>
</tbody>
</table>

### Table 5-10b. Anticipatory Guidance and Decision-Making Domain

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>Sig.</th>
<th>95.0% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>(Constant)</td>
<td>56.941</td>
<td>10.847</td>
<td>.000</td>
<td>35.448 - 78.434</td>
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<tr>
<td></td>
<td>Child age</td>
<td>-.145</td>
<td>.167</td>
<td>-.073</td>
<td>.388  -475 .186</td>
</tr>
<tr>
<td></td>
<td>Adults at home</td>
<td>-2.984</td>
<td>1.765</td>
<td>-.140</td>
<td>.094  -6.480 .513</td>
</tr>
<tr>
<td></td>
<td>Maternal HL</td>
<td>-3.259</td>
<td>1.317</td>
<td>-.206</td>
<td>.015  -5.868 -1.650</td>
</tr>
<tr>
<td></td>
<td>Worked together</td>
<td>10.177</td>
<td>2.002</td>
<td>.430</td>
<td>.000  6.211 14.143</td>
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</tbody>
</table>

### Table 5-10c. Anticipatory Guidance and Interpersonal Style Domains

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>Sig.</th>
<th>95.0% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>(Constant)</td>
<td>70.965</td>
<td>16.638</td>
<td>.000</td>
<td>37.983 - 103.947</td>
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<tr>
<td></td>
<td>Child age</td>
<td>-.264</td>
<td>.161</td>
<td>-.134</td>
<td>.103  -583 .054</td>
</tr>
<tr>
<td></td>
<td>Adults at home</td>
<td>-3.146</td>
<td>1.775</td>
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222
Table 5-11a. Family Centered Care and Communication Domains

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Table 5-11b. Family Centered Care and Decision-Making Domain

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Table 5-11c. Family Centered Care and Interpersonal Style Domain

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Table 5-12a. Helpfulness of Care and Communication Domains

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Table 5-12b. Helpfulness of Care and Decision-Making Domain

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Table 5-12c. Helpfulness of Care and Interpersonal Style

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Table 5-13a. Assessment of Family Well-being and Communication Domains

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Table 5-13b. Assessment of Family Well-being and Decision-Making Domain

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Table 5-13c. Assessment of Family Well-being and Interpersonal Style

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CHAPTER SIX

Dissertation Summary

Individuals with low health literacy (HL) lack the capacity to sufficiently read, comprehend, and act on medical information, and interact adequately with the health care system (Nielsen-Bohlman, Panzer, & Kindig, 2004). Evidence to date suggests that adult patients with low HL possess poor knowledge of chronic conditions (Gazmararian, Williams, Peel, & Baker, 2003); lack ability to navigate an increasingly complex health care system (Bade, Evertsen, Smiley, & Banerjee, 2008); have an increased risk of hospitalization (Baker et al., 2002) and an increased risk of mortality (Baker et al., 2007) when compared to those with higher levels of HL. Low HL also appears to interfere with effective self-management and collaborative care, can impede receipt of benefits from advances in health care, and further exacerbate health disparities in adult populations (Schillinger, Bindman, Wang, Stewart, & Piette, 2004).

Few studies have examined the relationship between parental or caregiver HL and pediatric health outcomes, including pediatric growth and development, despite recent evidence which indicates that a large number of parents also possess limited HL skills (Sleath et al., 2006; Yin, Dreyer, Foltin, Van Schaick, & Mendelsohn, 2007). Conflicting results in the small number of pediatric studies completed to date suggest an incomplete understanding of parental HL and its relationship to other factors associated with parental interaction with the health system. (DeWalt, Dilling, Rosenthal, & Pignone, 2007; Hironaka, Paasche-Orlow, Young, Bauchner, & Geltman, 2009; Moon, Cheng, Patel, Baumhaft, & Scheidt, 1998; Rosenthal et al., 2007; Ross, Frier, Kelnar, & Deary, 2001; Sanders, Thompson, & Wilkinson, 2007; Shone, Conn, Sanders, & Halterman, 2009).
These findings imply that parental HL is a complex construct subject to the possible influence of multiple cognitive and socio-demographic characteristics including parental self-efficacy, availability of social support and quality of interpersonal interactions, as well as cultural and linguistic factors. Importantly, child health outcomes depend on a parent’s ability to extract, communicate, analyze and use health information to participate in their child’s care (Ishikawa, Takeuchi, & Yano, 2008). Low parental HL has the potential to disrupt verbal and written communication and interfere with the development of high-quality parent-provider relationships resulting in suboptimal pediatric health care. Thus, limited parental HL can substantially disrupt access to pediatric health care, impede informed parent decision-making and exacerbate pediatric health disparities (Yin et al., 2009).

Consequently, this dissertation study explored the associations between functional literacy skills and a larger set of cognitive and psychosocial abilities in an effort to further elucidate the concept of parental HL. Specifically, this study examined the relationships between maternal HL, maternal perception of interpersonal interactions with providers, maternal self-efficacy in communicating with providers, and the perceived quality of ambulatory health care services received among a low-income, Latino pediatric population.

Review of Dissertation Chapters

Chapter One

Chapter One discussed the background, incidence and significance of HL in relation to health care outcomes and reasoned that specific cognitive and psychosocial factors have the potential influence an individual’s HL or capacity for HL. Specifically,
the ramifications of low parental HL were introduced and the objectives for this
dissertation were presented.

**Chapter Two**

Chapter Two reviewed relevant current literature regarding the impact of HL on
health outcomes, in particular pediatric health outcomes, and assessed the roles that self-
efficacy in communication, and interpersonal interactions with providers, play in
achieving optimal health for specific pediatric populations.

**Chapter Three**

Chapter Three reviewed Donabedian’s structure-process-outcome model (1980)
as modified by Coyle and Battles (1999) which served as the unifying conceptual
framework for this investigation. In addition, the chapter discussed Nutbeam’s
conceptualization of health literacy (2000, 2008), Bandura’s Social Learning Theory,
specifically his conceptualization of self-efficacy (1977), and the conceptual framework
This discussion served as the framework for the selection of investigation variables and
method of analysis.

**Chapter Four**

Chapter Four described the methods and procedures used to quantitatively
examine the relationships between maternal HL, maternal self-efficacy in
communication, interpersonal processes and the maternal perception of the quality of
pediatric ambulatory health care services received. Specifically, we conducted a cross-
sectional study of low-income Latina mothers and female caregivers of children 3 months
to 4 years in WIC clinics. We assessed maternal HL with the *Newest Vital Sign*, self-
efficacy using *Perceived Efficacy in Patient-Physician Interactions* (PEPPI), social support with the *Family Support Scale*, interpersonal interactions with the *Interpersonal Processes of Care in Diverse Populations* (IPC) survey and maternal perception of quality of pediatric ambulatory care using the *Promoting Health Development Survey* (PHDS). We calculated descriptive statistics for all demographic data, predictor and outcomes variables. Further, we assessed bivariate correlations among these variables and conducted multiple regression and hierarchical regression analyses to assess the strength of associations among related variables.

Chapter Five

Chapter Five comprised three manuscripts, two of which reported the results for the specific aims of this study. A third manuscript expanded upon the literature review provided in Chapter Two by further exploring the evidence associated with health literacy and parent-provider communication. These manuscripts are briefly reviewed here:

(1) Parent-Provider Communication within the Context of Limited Health Literacy: A Literature Review

This paper reviewed the evidence examining parent-provider communication within the context of parental HL. The databases MEDLINE, CINAHL and PsycInfo were searched for English-language articles published from 1996 to 2011 using the following search terms, “health literacy,” “literacy,” and “parent,” and “communication” in combination with the medical subject headings (MeSH) “physician-patient relations.” Only three papers were identified that specifically assessed parental HL and provider communication while eight papers described provider perception of parental HL. Collectively, these studies reveal that HCPs lack sufficient knowledge and understanding
of HL and as a result, fail to act or act inappropriately in response to a patient with low HL. Moreover, the majority of HCPs have not incorporated specific evidence-based “best practices” into their routine care of patients and families. In addition, institutional factors may influence how HCPs respond to HL issues. Although the mechanisms remain unclear, evidence indicates that HL plays some role in whether health care encounters are beneficial and productive.

(2) The Association of Health Literacy, Social Support and Self-Efficacy with Interpersonal Interactions with Health Care Providers in Low-Income Latina Mothers

This paper presented the results of specific aims 1, 2, 3a and 3b of this dissertation. Specifically, we described the levels of maternal HL, maternal perception of interpersonal interactions with providers, and maternal self-efficacy for communicating with health care providers. Further, we analyzed associations between and among these variables, as well as maternal acculturation and primary maternal language used, and maternal access to other adult support. We hypothesized that maternal HL would be significantly associated with access to other adult support, and acculturation/primary maternal language used. We also surmised that maternal HL would be significantly associated with maternal self-efficacy for communicating with providers and with the subscales of interpersonal interactions with providers when controlling for statistically significant demographic antecedents and structure covariates.

Significant relationships between maternal HL and self-efficacy for communication were not found but important relationships between self-efficacy and informal support and self-efficacy and a communication domain, “elicits concerns,” were
noted. Elucidating the interrelationships between these variables, especially for a low-income minority population, has provided an important step towards understanding how these factors impact maternal interaction with the health care system or influence pediatric health disparities.

(3) Health Literacy and Interpersonal Interactions as Predictors of Maternal Perception of Ambulatory Care for Low-Income, Latino Children

This paper presented the results of specific aims 3c, 4a and 4b of this dissertation. We examined the associations between maternal HL and maternal-provider interpersonal processes, and their respective influence on maternal perception of the quality of pediatric ambulatory services received. Predictor variables included maternal HL, measured with the Newest Vital Sign, and perception of interpersonal interactions with HCPs, assessed using the Interpersonal Processes of Care in Diverse Populations (IPC) survey. Maternal perception of quality of pediatric ambulatory care was measured using four subscales of the Promoting Health Development Survey (PHDS): (1) anticipatory guidance, (2) family-centered care, (3) helpfulness of care provided, and (4) assessment of family well-being.

We hypothesized that maternal self-efficacy for communicating with providers would be significantly predictive of maternal perception of quality of primary pediatric ambulatory care received for each one of the quality of care subscales when controlling for statistically significant demographic characteristics, and structural covariates, as well as maternal HL and maternal perception of interpersonal interactions with providers. Moreover, we anticipated that maternal perception of interpersonal interactions with
providers, measured by subscale, would also predict maternal perception of quality of primary pediatric ambulatory care received by subscale, in adjusted models.

Hierarchical regression analyses revealed a complicated picture. Maternal HL contributed far less to the outcome variables than anticipated. Instead, maternal perception of provider communication, decision-making processes and interpersonal style explained a significant amount of the variance in each of the quality of care outcome variables. Speaking with clarity, explaining results fully and working with a parent to determine a child’s plan of care was most predictive of whether a mother or female care giver perceived that her child received quality ambulatory care services. This data supports the hypothesis that interpersonal processes are substantially related to mother-provider health care exchange, particularly among low-income populations.

**Directions for Future Research and Conclusion**

Findings from this dissertation research provide considerable evidence that complex relationships of varying degrees exist between maternal HL, maternal perception of interpersonal interactions with providers, maternal self-efficacy in communicating with providers, and the perceived quality of ambulatory health care services received among a low-income, Latino pediatric population. Of particular note is the relationship between informal social support and self-efficacy, and self-efficacy and the communication domain, “elicits concerns.” Although maternal HL appears to be related to the successful transmission of anticipatory guidance, the delivery of family centered care and the helpfulness of information provided, it HL contributed far less to the outcome variables than anticipated. Maternal HL may be a more dynamic and multifaceted concept than previously understood. Indeed, assessing maternal HL in
combination with relevant demographic factors and specific interpersonal interaction
domains reveals a complicated picture. Consequently, maternal HL itself did not
substantially contribute in predicting maternal perception of quality of care in this study.
Notably however, effective communication between a Latina mother and her child’s HCP
significantly predicted her perception of the quality of pediatric ambulatory health care
received.

Importantly, this dissertation was a cross-sectional design with limited ability to
infer causality. Our findings merely support the associations noted among these
variables. Further, these findings may not be generalizable to all low-income Latina
mothers of young children as this sample population comprised mothers receiving WIC
benefits at the time of this study which could indicate they possess greater knowledge
about available resources and more confidence about obtaining those resources. Thus,
our data does not reflect those who do not receive this benefit. Importantly, we also do
not know how the duration of the maternal relationship with the HCP or specific
attributes of the HCP, neither of which was measured here, influenced mother-provider
communicative interactions. Nonetheless, our study provides insights into the
relationships between maternal HL, self-efficacy, social support and interpersonal
process of care in low-income Latina mothers, heretofore, previously unexamined.

Future research should focus on clarifying the interrelationships between these
variables, especially in low-income minority populations. Importantly, investigations
using study designs that allow for the determination of causal relationships among these
variables are desperately needed. Moreover, additional research is necessary to better
illuminate those factors that help or hinder information exchange between a HCP and a
parent or caregiver with or at risk for limited HL. Of particular importance is the need to “untangle” the influence of culture and language on HL, so as to better differentiate legitimate cultural health beliefs or folk beliefs from a perceived lack of understanding regarding conventional treatment options. Further, greater exploration of those factors that influence each of the interpersonal process domains is warranted. Such information could then be used to develop educational initiatives to improve the quality of communication by HCPs, particularly with diverse groups (Stewart et al., 1999). In addition, a deeper understanding of how informal support promotes the development of maternal self-efficacy would provide evidence to guide interventions for vulnerable populations, such as Latina mothers with limited HL, to increase confidence in participating in health care encounters. Moreover, many resources presently exist to support HCPs instituting practical strategies to reduce the burden of low HL in face-to-face encounters with patients and families. Few of these resources however, have been empirically evaluated for their impact on the quality of interpersonal interaction or health outcomes, especially in the pediatric setting. Research to identify which of these resources are most beneficial is clearly warranted. Finally, the results of this dissertation shed light on the complex nature of interpersonal interactions between a low-income Latina mother and her child’s HCP and serves to guide future efforts to develop appropriate interventions for use in caring for this population to improve child health outcomes, particularly in this and other vulnerable pediatric populations.
References: Chapter Six


APPENDIX 1
University of California, Los Angeles
CONSENT/PERMISSION TO PARTICIPATE IN A RESEARCH STUDY

Introduction: You are invited to take part in a research study conducted by Eileen Fry-Bowers, a registered nurse (RN), pediatric nurse practitioner (PNP) and doctoral student from the University of California, Los Angeles (UCLA). The study will help us understand how confident you feel in talking with and interacting with doctors and nurses, what kinds of support you have, and how these affect the kind of health care that your child receives.

You are being asked to participate in this study because you have identified yourself to be a Latina mother of a child between the ages of 3 months and 48 months (4 years) and you receive WIC or Temporary Assistance to Needy Families (TANF) or your child is enrolled in a Head Start or Healthy Start preschool program or another program serving low-income families.

This study will involve 118 mothers. Being part of the study is completely voluntary and will not affect whether or not you qualify for or receive WIC or TANF or whether your child can be or is in a Head Start or Healthy Start preschool program or other similar program.

Purpose of the Study: The purpose of this study is to understand how confident Latina mothers feel in talking with and interacting with health care providers, who supports them when their child needs health care, and how these things affect the kind of health care that their child receives.

Procedures: You will be asked questions about your understanding of a food label, about your confidence in talking with and how you feel when talking with doctors and nurses, about the people who support you, and about the kinds of care your child got the last time he or she saw a doctor or nurse. The questions will take about 30 minutes.

Potential Risks and Discomforts: The risk to you is that you may get a little tired when answering the questions. You may also get sad, mad or upset as you answer the questions. You may choose to not answer any questions that you do not want to answer. You may stop answering questions at any time.
**Anticipated Benefits to Subjects:** You will not experience any direct benefit from participating in this study. However, you may feel good about sharing your feelings about your experiences with doctors and nurses that you may not have had the chance to do before this experience.

**Anticipated Benefits to Society:** The results from this study will help us understand how Latina mothers of young children feel about their experiences getting health care for their children so that we can improve health care and promote wellness in their children.

**Alternatives to Participation:** The study does not involve treatments and no treatments will be withheld. You may choose not to participate in this study.

**Payments for Participation:** A $20 gift card will be given to you after completing the questionnaires.

**Privacy and Confidentiality:** Your answers will be identified only by a study identification number and only key study personnel will have access to the study identification. Any articles that are published or submitted will be based upon grouped study data and only be identified by demographic markers (i.e., age, gender, and ethnicity). No participants will be identified by name or subgroup characteristic(s) in study publications.

**Participant Withdrawal:** Your participation in this research study is entirely voluntary. Your choice of whether to participate or not in this study will not affect whether or not your qualify for or receive WIC or TANF or whether your child can be or is in a Head Start or Healthy Start preschool program or other similar program.

**What are my rights if I take part in this study?:** You can choose whether or not to be in this study. If you agree to participate in this study, you may withdraw your permission at any time without consequences of any kind. You are not waiving any of your legal rights if you choose to participate in this research study. If you wish to ask questions about your rights as a research participant or if you wish to voice any problems or concerns you may have about the study to someone other than the researcher(s), please call the Office of the Human
Research Protection Program (OHRPP) at (310) 825-7122 or write to the Office of the Human Research Protection, UCLA, 11000 Kinross Avenue, Suite 102, Box 951694, Los Angeles, CA 90095-1694.

**Identification of Investigator:** The research is being conducted by Eileen Fry-Bowers. You may ask any questions that you have now. If you have questions later, you may contact Eileen Fry-Bowers at 951-323-2356.

**SIGNATURE OF RESEARCH PARTICIPANT**

Your signature below indicates that you have read this document or it has been read to you; you understand its meaning; have had a chance to ask questions; have had these questions answered to your satisfaction; and agree to participate in this research study. You have been given a signed copy of this permission form.

_____________________________
Name of Participant

_____________________________   _______________________
Signature of Participant          Date

**SIGNATURE OF INVESTIGATOR**

I, or the research assistant (for Spanish speaking participants), have explained the research to the participant and have answered all of their questions. I believe that they understand all of the information described in this document and freely give assent/consent/permission to participate.

_____________________________
Name of Investigator

_____________________________   _______________________
Signature of Investigator        Date (must be the same as subject’s)
Introducción: Usted está invitada a participar en un estudio de investigación realizado por Eileen Fry-Bowers, una enfermera registrada (RN), enfermera practicante de pediatría (PNP) y estudiante de doctorado de la Universidad de California, Los Ángeles (UCLA). El estudio nos ayudará a comprender qué tanta confianza siente para hablar e interactuar con médicos y enfermeras, qué tipos de apoyos tiene y cómo estos afectan el tipo de atención médica que recibe su hijo.

Se le pide que participe en este estudio porque se ha identificado como una madre Latina que tiene un niño de 3 meses a 48 meses (4 años) de edad, y recibe WIC o Asistencia Temporal para Familias con Necesidades (TANF) o su hijo está inscrito en un programa preescolar de Comienzo Adelantado (Head Start) o Comienzo Saludable (Healthy Start) u otro programa que ayuda a las familias de bajos ingresos.

Habrá 118 madres involucradas en este estudio. El ser parte del estudio es completamente voluntario y no afectará si califica para o recibe WIC o TANF o no o si su hijo puede estar o está en un programa preescolar de Comienzo Adelantado o Comienzo Saludable u otro programa similar.

Propósito del Estudio: El propósito de este estudio es comprender qué tanta confianza sienten las madres Latinas para hablar e interactuar con proveedores de atención médica, quién las ayuda cuando su hijo necesita atención médica, y cómo estas cosas afectan el tipo de atención médica que recibe su hijo.

Procedimientos: Se le harán preguntas acerca de su comprensión de las etiquetas de alimentos, qué tanta confianza siente en hablar con médicos y enfermeras y cómo se siente cuando habla con ellos, sobre las personas que la ayudan y acerca de los tipos de cuidado que su hijo recibió la última vez que vio a un médico o a una enfermera. Las preguntas tardarán unos 30 minutos.

Riesgos Potenciales y Molestias: El riesgo para usted es que tal vez pueda estar un poco cansada al responder las preguntas. También puede ponerse triste, enojarse o molestarse a medida que responde las preguntas. Puede optar por no responder a cualquier pregunta que no quiera responder. Puede dejar de contestar las preguntas en cualquier momento.
**Beneficios Anticipados para los Sujetos**: No experimentará ningún beneficio directo por participar en este estudio. Sin embargo, tal vez se sienta bien acerca de compartir sus sentimientos sobre sus experiencias con médicos y enfermeras ya que tal vez usted no haya tenido la oportunidad de hacerlo antes de esta experiencia.

**Beneficios Anticipados para la Sociedad**: Los resultados de este estudio nos ayudarán a comprender cómo se sienten las madres Latinas de niños pequeños acerca de sus experiencias de recibir atención médica para sus hijos para que podamos mejorar la atención médica y promover el bienestar de sus hijos.

**Alternativas a la Participación**: El estudio no implica tratamientos y ningún tratamiento será rechazado. Usted puede optar por no participar en este estudio.

**Pagos por Participar**: Se le dará una tarjeta de regalo de $20 después de completar los cuestionarios.

**Privacidad y Confidencialidad**: Sus respuestas serán identificadas solamente por un número de identificación de estudio y sólo el personal clave del estudio tendrá acceso a la identificación del estudio. Cualquier artículo que sea publicado o presentado se basará en datos agrupados del estudio y sólo estará identificado por marcadores demográficos (por ejemplo, edad, sexo y origen étnico). Ningún participante será identificado por nombre o característica(s) de subgrupo en las publicaciones del estudio.

**Retirada del Participante**: Su participación en este estudio de investigación es totalmente voluntaria. Su elección de participar o no en este estudio no afectará si califica para o recibe WIC o TANF o no, o si su hijo puede estar o está en un programa preescolar de Comienzo Adelantado o Comienzo Saludable u otro programa similar.

¿Cuáles son mis derechos si participo en este estudio?: Usted puede elegir si quiere ser parte de este estudio o no. Si acepta participar en este estudio, puede retirar su permiso en cualquier momento sin consecuencias de ningún tipo. Usted no está renunciando a ninguno de sus derechos si decide participar en este estudio de investigación. Si desea hacer alguna pregunta acerca de sus derechos como participante de una investigación o si desea expresar algún problema o preocupación que tenga sobre el estudio a alguien que no sea el/los
investigador(es), por favor llame a la Oficina del Programa de Protección para la Investigación Humana (OHRPP) al (310) 825-7122 o envíe una carta a la Oficina de Protección para la Investigación Humana, UCLA, 11000 Kinross Avenue Suite 102, Box 951694, Los Ángeles, CA 90095-1694.

**Identificación del Investigador:** La investigación es realizada por Eileen Fry-Bowers. Usted puede hacer cualquier pregunta que tenga ahora. Si tiene más preguntas más tarde, puede comunicarse con Eileen Fry-Bowers al 951-323-2356.

<table>
<thead>
<tr>
<th>FIRMA DE LA PARTICIPANTE DE LA INVESTIGACIÓN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Su firma a continuación indica que ha leído este documento o que se le ha leído a usted; usted comprende su significado; ha tenido la oportunidad de hacer preguntas; se le ha respondido a estas preguntas satisfactoriamente; y está de acuerdo en participar en este estudio de investigación. Se le ha dado una copia firmada de este formulario de permiso.</td>
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**Nombre de la Participante**

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<table>
<thead>
<tr>
<th>Firma de la Participante</th>
<th>Fecha</th>
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**FIRMA DEL INVESTIGADOR**

Yo, o el asistente de investigaciones (para participantes hispanohablantes), le he explicado la investigación a la participante y he respondido a todas sus preguntas. Creo que comprenden toda la información que se describe en este documento y libremente da asentimiento/consentimiento/permiso para participar.

---

**Nombre del Investigador**

---

| Firma del Investigador | Fecha (debe ser la misma que la del sujeto) |
APPENDIX 2

**Demographic Questionnaire:**

1. When were you born? __________

2. Were you born in the United States?  
   □ yes  □ no
   
   2a. If no, where were you born? __________
   
   2b. What year did you come to live in the United States? ________

3. How many children do you have? __________

4. How many adults live at home? __________

5. How confident are you filling out medical forms by yourself?  
   □ Not at all  □ A little bit  □ Somewhat  □ Quite a bit  □ Extremely

6. Does your child have health insurance?  
   □ yes  □ no
   
   6a. If yes, what type of insurance does your child have?  
   □ Medi-Cal  □ Healthy Families (IEHP, Molina) / Healthy Kids  □ Private (like Health Net, Kaiser, Blue Shield, etc.)

7. Do you usually go to the same place to get health care for your child?  
   □ yes  □ no

8. Where do you usually go to get health care for your child?  
   □ Clinic / Doctor’s office  □ Urgent care  □ Emergency department
9. Do you usually see the same health care provider when you take your child to get health care?
   □ yes    □ no

9a. If yes, is the health care provider a:
   □ Doctor
   □ Nurse Practitioner
   □ Physician’s Assistant
   □ I don’t know
   □ Other _______________________

10. At home, who helps you understand what to do for your child’s health?
    □ Mother / mother-in-law / aunt / sister / sister-in-law (female relative)
    □ Husband / partner
    □ Other _______________________

11. What was the last grade you completed?
    □ less than 6th grade
    □ 6th grade
    □ 7th grade
    □ 8th grade
    □ 9th grade
    □ 10th grade
    □ 11th grade
    □ 12th grade
    □ some college
    □ completed college

12. What language(s) do you read and speak?
    □ Only Spanish
    □ Spanish more than English
    □ Both equally
    □ English more than Spanish
    □ Only English

13. What language(s) did you use as a child?
    □ Only Spanish
    □ Spanish more than English
    □ Both equally
    □ English more than Spanish
    □ Only English
14. What language(s) do you usually speak at home?
   - Only Spanish
   - Spanish more than English
   - Both equally
   - English more than Spanish
   - Only English

15. In which language(s) do you usually think?
   - Only Spanish
   - Spanish more than English
   - Both equally
   - English more than Spanish
   - Only English

16. What language(s) do you usually speak with your friends?
   - Only Spanish
   - Spanish more than English
   - Both equally
   - English more than Spanish
   - Only English
Cuestionario demográfico:

1. ¿Cuándo nació? ________________

2. ¿Nació en los Estados Unidos?
   □ sí  □ no
   
   2a. Si la respuesta es no, ¿dónde nació? ________________
   
   2b. ¿En qué año vino a vivir a los Estados Unidos? ________

2. ¿Cuántos hijos tiene? ________________

3. ¿Cuántos adultos viven en su hogar? ________________

4. ¿Cuántos niños viven en su hogar? ________________

5. ¿Cuán seguro se siente cuando completa formularios médicos usted solo?
   □ Nada seguro
   □ Apenas seguro
   □ Algo seguro
   □ Bastante seguro
   □ Totalmente seguro

6. ¿Tiene su hijo un seguro de salud?
   □ sí  □ no
   
   6a. Si la respuesta es sí, ¿qué tipo de seguro tiene su hijo?
      □ Medi-Cal
      □ Healthy Families (Familias saludables) (IEHP, Molina)/Healthy Kids (Niños saludables)
      □ Privado (como Health Net, Kaiser, Blue Shield, etc.)

7. ¿Generalmente acude al mismo lugar para obtener atención de la salud para su hijo?
   □ sí  □ no

8. ¿Dónde suele acudir para obtener atención de la salud para su hijo?
   □ Clínica/consultorio médico
   □ Atención de urgencias
   □ Departamento de emergencia

9. ¿Suele acudir al mismo proveedor de atención de la salud cuando su hijo necesita recibir atención de la salud?
☐ sí       ☐ no

9a. Si la respuesta es sí, el proveedor de atención de la salud es un:
☐ Médico
☐ Enfermero practicante
☐ Auxiliar médico
☐ No sé
☐ Otro ____________________

10. En su hogar, ¿quién lo ayuda a entender lo que debe hacer por la salud de su hijo?
☐ Madre/suegra/tía/hermana/cuñada (pariente de sexo femenino)
☐ Esposo/pareja
☐ Otro ____________________

11. ¿Cuál fue el último grado que completó?
☐ menos de 6.° grado
☐ 6.° grado
☐ 7.° grado
☐ 8.° grado
☐ 9.° grado
☐ 10.° grado
☐ 11.° grado
☐ 12.° grado
☐ Cursó parte de una carrera universitaria
☐ Completó una carrera universitaria

12. ¿Qué idioma(s) lee y habla?
☐ Solo español
☐ Español más que inglés
☐ Ambos con el mismo nivel
☐ Inglés más que español
☐ Solo inglés

13. ¿Qué idioma(s) usaba en su niñez?
☐ Solo español
☐ Español más que inglés
☐ Ambos con el mismo nivel
☐ Inglés más que español
☐ Solo inglés
14. ¿Qué idioma(s) suele hablar en su hogar?
   - Solo español
   - Español más que inglés
   - Ambos con el mismo nivel
   - Inglés más que español
   - Solo inglés

15. ¿En qué idioma(s) suele pensar?
   - Solo español
   - Español más que inglés
   - Ambos con el mismo nivel
   - Inglés más que español
   - Solo inglés

16. ¿Qué idioma(s) suele hablar con sus amigos?
   - Solo español
   - Español más que inglés
   - Ambos con el mismo nivel
   - Inglés más que español
   - Solo inglés