MATERNAL DEPRESSIVE SYMPTOMS AND OUTCOMES OF ADOLESCENTS

WITH TYPE 1 DIABETES IN A DIVERSE SAMPLE

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DEDICATION

I would like to thank the members of my Graduate Committee for aiding me in the completion of this project, and to Chris Willis for his unending support.

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by

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THESIS

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ABSTRACT

Purpose/Background: Maternal depression can have deleterious effects on adolescents'
psychosocial adjustment and management of type1 diabetes. These associations have
been primarily studied among Caucasian middle-income families. Ethnic minority status
and economic disadvantage may alter the experience of maternal depressive symptoms
and their association with adolescent diabetes management. The purpose of this study
was to determine if mothers' depressive symptoms are similarly associated with
adolescent diabetes outcomes in Caucasian and Latino/a youth, and whether associations
occur independent of socioeconomic factors.

Methods: Participants were Caucasian and Latina mothers and their adolescents with
type I diabetes (N=118 dyads; 48% Latino; 54% female; 10 to 15 years old; illness
duration > 1 year; 25% on insulin pump). Mothers completed surveys assessing
depressive symptoms, household income and parental education. Adolescents reported
treatment adherence and depressive symptoms. Metabolic control was determined from
HbA1c from medical records. Socio-demographic information was collected through a
combination of maternal report and census tract data.

Results: Although Latino participants had lower socioeconomic status (SES) than
Caucasian participants, there were no ethnic group differences in terms of parental
marital status, adolescent age, adolescent gender, illness duration, or insulin pump status.
Latina mothers reported significantly more depressive symptoms than Caucasian mothers
$t\,(112) = 2.48$, $p = .015$, and these differences were independent of lower SES among
Latina mothers. Hierarchical regression analyses revealed maternal reports of depressive
symptoms were associated with higher adolescent depression $t(108) = 1.98$, $p = .05$, but

this association was moderated by both a two-way interaction with adolescent age, $t(105)$ = 2.13, p = .036, and a three-way interaction with age and ethnicity, $t(104)$ = -2.05, p = .043. Among older Latino adolescents, maternal depressive symptoms were positively associated with adolescent report of depression; this association was not found among older Caucasian participants or among younger participants. There were no significant associations between maternal depressive symptoms and adolescent adherence. All associations remained independent of SES indicators, which were generally unrelated to adolescent outcomes

Conclusion: Maternal depressive symptoms may undermine the psychosocial adjustment of adolescents with diabetes, but appears to have complex associations with diabetes management across ethnic groups. The finding that Latino youth did not experience heightened depression despite the risks of their mother's elevated depressive symptoms and lower SES is potentially quite important. If replicable, further research should explore potential protective factors that may be contributing to adolescent diabetes outcomes in Latino families.

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LIST OF ABREVIATIONS

SES – Socioeconomic status

CES-D – Center for Epidemiological Study Depression Scale

SCI – Self Care Inventory

CDI – Children's Depression Inventory

HbA1c- Glycosolated hemoglobin, indicator of metabolic control

CHAPTER ONE

Introduction

Type 1 diabetes mellitus is a chronic disease that has a very complex and demanding treatment regimen. Type 1 diabetes occurs when the pancreas does not produce enough insulin to properly control blood glucose levels. Insulin is a necessary hormone that regulates glucose metabolism, which is essential for growth, activity, wound healing, and brain function. Without insulin, the body becomes starved of energy. Type 1 diabetes was once called juvenile onset diabetes and was thought to have an exclusively childhood onset. Although most commonly diagnosed in childhood, the illness can occur at any age and has an estimated prevalence of approximately 1 per 500 to 600 children.

The exact cause of type 1 diabetes is unknown, but it is believed to reflect an autoimmune destruction of insulin-producing, pancreatic beta cells which causes glucose to build up in the bloodstream and remain unavailable to cells which require it for metabolic function. The administration of exogenous insulin to compensate for the body's lack of insulin production is a lifelong requirement for those diagnosed with type 1 diabetes. This requires continual monitoring of blood glucose levels, multiple daily injections or the use of an insulin pump, strict adherence to diet and exercise regimens, and frequent doctor appointments. Abnormally high (hyperglycemia) or low (hypoglycemia) blood glucose levels must be promptly detected and corrected.

Adolescence is a particularly difficult developmental period for optimal glycemic control, and poor glycemic control has serious consequences. The multifaceted changes

of adolescence that are believed to contribute to difficulties in adolescent diabetes management include the normal insulin resistance that occurs during puberty; the cognitive, social, emotional and physical transitional nature of adolescence; and the tendency of parents to be less involved in diabetes management responsibilities (Amiel et al., 1986; Anderson & Auslander, 1990; Wysocki et al., 1996). Diabetes management is demanding, requires fortitude from adolescents and their families, and can determine immediate and long-term health and psychosocial well-being. If mismanaged, dysregulation of the body's blood glucose levels can directly result in serious consequences including hypoglycemia, hyperglycemia, diabetic ketoacidosis, brain damage, and even death in the short term (Desrocher & Rovet, 2004; Silverstein et al., 2005). Long-term complications of diabetes mismanagement include cardiovascular disease, retinopathy, neuropathy, nephropathy, and non-traumatic limb amputation (Deckert, Poulsen, & Larsen, 1978; Silverstein et al., 2005).

Parents – particularly mothers – play an important role in adolescent diabetes management. Daily diabetes management is complex and requires close collaboration with an adult caregiver who is highly familiar with the nuances of the youth's diabetes management. Although fathers' involvement in diabetes management is important (Berg et al., 2008), mothers remain the primary caregivers of youth with chronic conditions (Wysocki et al., 2009), and are therefore the focus of the present study.

Mothers of children with type 1 diabetes experience psychosocial distress (Kovacs, Goldston et al., 1997; Mullins et al., 2004), which may undermine their ability to facilitate their adolescent's diabetes management. A review of parent and family functioning in families of children with chronic illness found that greater maternal

psychological adjustment problems were related to poorer psychosocial adjustment in children (Drotar, 1997). More specifically, higher maternal distress was related to higher levels of distress in children with type 1 diabetes, and maternal psychological distress and depressive symptoms predicted later child depressive symptoms (Chaney et al., 1997; Kovacs, Goldston et al., 1997) and poorer metabolic control (Wiebe et al., 2011). Taken together, these findings suggest that adolescents with type 1 diabetes whose mothers experience significant emotional distress, may themselves experience poorer psychosocial adjustment and diabetes management.

Most research on associations between maternal depression and adolescent diabetes outcomes has been conducted in Caucasian samples, but such associations may differ in samples that are ethnically diverse. Studies examining the prevalence of depression across ethnic populations have yielded diverse findings. Some studies have found that depression is related to ethnicity, such that Americans who self identified as Latinos had higher levels of general depression as compared to African Americans and Caucasian Americans (Yang & Jones, 2008; Diaz et al., 2009), while others suggest that minority status is not necessarily linked to higher rates of depression (Kessler et al., 2003; Lewis-Fernandez, Das, Alfonso, Weissman, & Olfson, 2005). Furthermore, this relationship has not been studied in the context of parenting or caregiving for children with chronic illness such as diabetes. Depression may be expressed differently and have different outcomes across Caucasian and Latino families. A growing literature suggests that ethnic differences in parenting exist (Halgunseth, Ispa, & Rudy, 2006; Smetana, Campione-Barr, & Metzger, 2006), which is relevant to the present context because

maternal depression may confer risk to adolescents by undermining effective parenting or caregiving effectiveness.

A study of ethnic differences is incomplete without considering the role of socioeconomic status (SES). Although there is great heterogeneity in SES within different ethnic groups, it is still the case that Caucasians often occupy a higher income status than do minority populations (DeNavas-Walt, Proctor, & Lee, 2005), including Latinos. Thus, there may be a confound between ethnicity and SES. This is particularly problematic when one considers that lower SES is related to higher depressive symptoms as well as to less effective parenting, for both Latina (Hashima & Amato, 1994) and Caucasian mothers (Drew, Berg, King, Griffith, & Wiebe, 2011). Therefore, SES may confound the identification of ethnic differences in parenting an adolescent with type 1 diabetes.

The goals of this study were threefold. The first was to determine the relationship between maternal depression and health outcomes (i.e., metabolic control, adherence, and psychological adjustment) in a diverse sample of Caucasian and Latino adolescents with type 1 diabetes. The second was to examine if these associations between maternal depression and adolescent health outcomes differ as a function of ethnicity. The third was to determine if ethnic differences in the associations between maternal depressive symptoms and adolescent outcomes occur independently of socioeconomic status.

CHAPTER TWO

Review of the Literature

Managing Type I Diabetes During Adolescence

Managing diabetes can be difficult during any stage of life, but this is especially true during adolescence. For youth with diabetes, adolescence is characterized by poor metabolic control (Anderson, Auslander, Jung, Miller, & Santiago, 1990), problems adhering to prescribed regimens (Anderson et al., 1990; Johnson, Kelly, Henretta, Cunningham, Tomer, & Silverstein 1992; Johnson, Freund, Silverstein, Hansen, & Malone, 1990; Kovacs, Goldston, Obrosky, & Iyengar, 1992; La Greca, Follansbee, & Skyler, 1990; Weissberg-Benchell et al., 1995), and poor psychological adjustment (Blanz et al., 1993; Kovacs, Goldston, Obrosky, & Bonar, 1997; Kovacs, Goldston et al., 1997). These well-documented patterns of deterioration in metabolic control, adherence, and psychological adjustment may be related to the many physical and psychosocial changes that occur during this time. Adolescence is a period of rapid biological change accompanied by increasing physical, cognitive, and emotional maturity. For adolescents, the challenge of diabetes self-management is combined with the developmental tasks of adapting to puberty and a changing body image, peer group pressure, autonomy from parents and identity formation (Delamater, 1999; Silverstein et al., 2005). Adolescents typically engage in experimentation and risk-taking behaviors that may adversely affect self-care and clinical outcomes (Anderson, Ho, Brackett, Finkelstein & Laffel, 1997). Many adolescents with type 1 diabetes do not self-test their blood glucose according to standard medical recommendations and adolescents fail to follow the dietary

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recommendations for diabetes maintenance and/or fail to administer insulin appropriately for the carbohydrates they consume (Patino, Sanchez, Eidson, & Delamater, 2005).

Managing diabetes during adolescence is also important because adolescents are learning the skills they will carry into adulthood and because of the long-term consequences of mismanagement. Blood glucose levels, adherence, and psychological adjustment are considered important markers of illness management among adolescents with diabetes (Silverstein et al., 2005). Longitudinal research demonstrates that patterns of diabetes management that emerge during adolescence are carried into adulthood and have been found to predict long-term adherence and metabolic control (Bryden, Dunger, Mayou, Peveler & Neil, 2003; c.f. Diabetes control and Complications Trial, 1994; Hamilton & Daneman, 2002). Patterns of nonadherence also lead to poorer metabolic control (Hood et al., 2006), which increases the likelihood of developing diabetes related complications including heart disease, stroke, blindness, neuropathy and skin and limb complications (Silverstein et al., 2005).

Adolescents with diabetes have elevated risk for emotional disturbance which may undermine diabetes management. Adolescents with diabetes have higher rates of major depression and generalized anxiety disorder when compared with adolescents without diabetes or with other chronic conditions (Blanz, Rensch-Rienmann, Fritz-Sigmund, & Schmidt, 1993), and have higher rates as compared to the general population (Blanz et al., 1993). In a study that followed youth with type 1 diabetes for 9 years, 42.4% of youth developed at least one episode of psychological disorder during the follow-up, with depressive disorders being the most common (27.5%), followed by anxiety disorders (19.6%) (Kovacs, Goldston et al., 1997). Hood et al. (2006) found that

nearly one in seven youth with diabetes met the clinical cutoff on self-report measures of depression. This level of depressive symptoms in children and adolescents with type 1 diabetes is nearly double that of the highest estimate of depression in youth in general (i.e., 7%) (Lewinsohn, Clarke, Seeley, & Rohde 1994). Further, there is evidence that depression in children is related to poor metabolic control (Eckstein, Ellis, Kolmodin, & Naar-King, 2010; Hassan, Loar, Anderson, & Heptulla, 2006; Helgeson, Siminerio, Escobar & Becker, 2009; Hood et al., 2006), lower adherence (Korbel, Wiebe, Berg & Palmer, 2007), lower blood glucose monitoring frequency (Hood et al., 2006), lower self-efficacy, which was associated with fewer self-care behaviors (Armstrong, Mackey & Streisand, 2011), increased risk for retinopathy (Kovacs, Mukerji, Drash, & Iyengar, 1995), and increased risk for hospitalization (Stewart, Rao, Emslie, Klein, & White, 2005). As a result of these findings, the American Diabetes Association issued a statement calling for regular annual screening for depression in children ages 10 and older as part of diabetes clinical care (Silverstein et al., 2005).

In summary, management of type 1 diabetes is especially difficult during adolescence. It is evident that various facets of the adolescent experience can be of influence on diabetes care thereby elucidating the importance of considering multiple factors when evaluating outcomes of the adolescent with type 1 diabetes. The outcomes of diabetes management in adolescents have been measured in various ways. While metabolic control is an important measure of how each adolescent is managing his or her diabetes, it is equally important to examine possible reasons for this level of control, whether fair or poor. Management difficulties can be observed through the adolescent's adherence to medically prescribed regimens. Another factor to consider in difficulties

related to diabetes management is the amount of emotional distress the adolescent is experiencing. In the proposed study I obtained adolescents' self report of depressive symptoms, their self-report of adherence to their diabetes treatment, as well as an objective measure of their level of metabolic control.

Maternal Depressive Symptoms and Adolescents Diabetes Management

Parenting an adolescent with diabetes is an emotionally laden role which can be distressing and place mothers at risk for depressive symptoms. Mothers of children with type 1 diabetes experience higher levels of psychosocial distress than mothers of children without diabetes (Kovacs, Goldston et al., 1997; Mullins et al., 2004). This heightened distress begins at diagnosis and continues with recurring feelings of responsibility to manage the child's needs optimally, coupled with many long- and short-term worries of what might happen to their child (Melin, Nuemark-Sztainer, & Patterson, 2004). A mother's lack of confidence in her ability to manage her child's diabetes, high levels of responsibility for her child's diabetes management, and high worry and concern about her child's blood glucose levels were found to increase the frequency and intensity of stress she experiences related to caring for her child's illness (Streisand, Swift, Wickmark, Chen, & Holmes, 2005). Depressed mothers were also found to have lower confidence in their adolescent's ability to manage their diabetes (Butler et al., 2009; Cameron, Young & Wiebe, 2007).

In the general developmental literature, the experience of living with a depressed mother can have serious consequences for children, increasing their risk for a number of developmental and adjustment problems (Downey & Coyne, 1990). It is unknown if mothers' depressive symptoms are in response to children's behaviors or vice versa, but it

is well established that offspring of depressed mothers suffer a variety of adverse outcomes, including depression and behavioral disturbances (Anderson & Hammen, 1993; Cummings & Davies, 1994). Numerous factors may be involved (e.g., genetic transmission, observational learning resulting from exposure to depressive symptoms), but this association is believed to at least partially reflect impaired parenting (Downey & Coyne, 1990). In the pediatric diabetes literature, heightened maternal depression has been found to be related to poorer psychosocial adjustment, and poorer metabolic control in adolescents with diabetes (Jasser & Grey, 2010), and predicts depressive symptoms in children with type 1 diabetes, (Chaney et al., 1997; Drotar, 1997; Kovacs, Goldston et al., 1997). Specifically, Kovacs et al. (1997) found that children with type 1 diabetes whose mothers were depressed, developed depressive disorders at a rate of 2.64 times those whose mothers were not depressed. Thus, the present study included a self-report measure of mother's depressive symptoms because of the evidence that her levels of depression may undermine her ability to manage effectively the challenges of parenting an adolescent with diabetes.

Ethnic Differences in Parenting Between Caucasian and Latino Populations

Latino youth with type 1 diabetes and their families make up a large and growing part of the population, but are underrepresented in the literature. As of July 1, 2006, there were 44.3 million Latinos living in the USA, which accounts for 14.8% of the total population; one-third of this population is under the age of 18 (US Bureau of the Census 2006). Latino youth aged 10-19 may have an incidence of type 1 diabetes as high at 13.8 per 100,000 (Lawrence et al., 2009), and often have poorer metabolic control than their Caucasian counterparts (Davis et al., 2001; Delamater et al., 1999). Wang, Wiebe, and

White (2011) demonstrated that Latino youth begin adolescence with poorer metabolic control than their Caucasian counterparts, but then show the same rate of additional deterioration across adolescence. This suggests Latino youth with diabetes are at especially high risk during adolescence, and that they may be susceptible to the same adolescent risks for poor management that have been studied among Caucasians (e.g., declines in parental involvement).

Ethnic influences on parenting and family relationships may differentially affect Latina and Caucasian mothers' efforts to facilitate the adolescent's diabetes management. Latinos attribute more importance to the family as both a source and recipient of emotional support than do non-Latinos (Halgunseth et al., 2006). Familism or "feelings of loyalty, reciprocity, and solidarity towards members of the family, as well as the notion of the family as an extension of self" (Cortes, 1995, p. 249) has been associated with better physical and emotional health of adolescent Latinos (Dumka, Roosa, & Jackson, 1997; Hill, Bush, & Roosa, 2003). In Latino families, the socialization goal is to have children respect and abide by the centrality of the family in their lives, which may be reflected in the childrearing practice of insisting on children's conformity to parental and extended family authority (Zayas, 1994). Ramirez (1998) argued that, as a consequence of showing respect and deference to the father, the mother often becomes the affectional focus for children. Escovar and Lazarus (1982) noted that Latino families display closer maternal-child relationships and more open verbal and physical expression of parental affection than North American samples (as cited in Zayas, 1994, p. 318). A growing literature suggests that ethnic differences in parenting exist (Halgunseth et al., 2006; Smetana et al., 2006). This difference in parenting is relevant to the present context

because maternal depression may undermine a mother's ability to manage effectively the challenges of parenting an adolescent with diabetes.

Ethnic Differences in Depressive Symptoms Between Caucasian and Latino Populations

The development of depression may vary in Latino parents and their adolescents due to unique risk factors found in this ethnic group. Acculturation appears to be a risk factor in depression, with overall lower rates of depression and better physical functioning in Latino immigrants than in US born Latino individuals, as will be explained further within the context of the Hispanic Paradox. Acculturation may also play a role in parent-child relationships, particularly if parents and children hold divergent views of their familial roles. Spanish-speaking Latino women held more traditional gender-role values than Caucasian women (e.g., self-sacrificing care-taker, stay-at-home mother, defining oneself in terms of family) (Gil-Rivas, Greenberger, Chen, & Montero, 2003), and divergent gender role beliefs between parents and adolescents of immigrant families were associated with depressive symptoms in Latino youth (Cespedes & Stanley, 2008). That study highlighted how there may exist a potential disconnect between the values placed on gender roles between more acculturated Latino youth and their less acculturated parents. Finally, lack of resources available to Latinos, including limited Spanish services, legal status, and poverty, appear to increase risk for depression among parents and children, as discussed in more detail below.

In addition to their unique risks for depressive symptoms, Latino families may benefit from unique protective factors as well. The term Hispanic Paradox has been used to explain findings that Latino individuals appear to be resilient to the adverse health

outcomes linked to the challenges of lower SES relative to other racial or ethnic groups. That is, they do not display the high level of heart disease and infant mortality that non-Latino Caucasians face in similar socioeconomic circumstances (Palloni, & Morenoff, 2001). This protective factor may extend to manifestation of depressive symptoms. Interpersonal functioning, or maintaining strong social support networks, has been shown to act as a protective factor against depression and has been found to be higher among Latino versus non-Latino Caucasian individuals (Plant & Sachs-Ericson, 2004). Likewise, familism, a social value placed on the family, may promote social support, and reduce depressive symptoms even when increased SES risk is present (Menselson, Rehkopf, & Kubzansky, 2008). Gil-Rivas et al. (2003) noted that Latino individuals adhered to more traditional family values and generally defined themselves in reference to family members, and concluded that the higher levels of parental warmth and acceptance were associated with lower levels of depressive symptoms in Latino adolescents.

The risk and protective factors related to the manifestation of depressive symptoms in Latinos should be considered when comparing depressive symptoms between ethnic groups. Like in Caucasian populations, more parent-adolescent conflicts were associated with higher levels of depressed mood in adolescents and their parents (Gil-Rivas et al., 2003). As previously mentioned, research indicates that the development of depression may vary in Latino parents and their adolescents because of ethnic group differences such as acculturation, familism or the Hispanic paradox. While parenting differences will not be measured in this study, these differences may affect how the mothers or adolescents in our sample manifest depressive symptoms. These factors

must be considered in the context of the current study, which is interested in studying differences between Caucasian and Latino groups.

The Role of Socioeconomic Factors in Understanding Ethnic Differences in Adolescent Diabetes Outcomes

Socioeconomic status (SES) must be considered when examining ethnic differences in adolescent diabetes outcomes. Although the Latino population in the United Stated experiences remarkable SES heterogeneity among its various subgroups (US Bureau of the Census 2003), Latinos may experience lower economic security more often than Caucasians (DeNavas-Walt, Proctor, & Lee, 2005). This pattern creates a potential confound when studying ethnic differences in parenting adolescents with diabetes because lower SES can make parenting more difficult for both Latina and Caucasian mothers, and is related to higher levels of maternal depressive symptoms and psychological distress (Drew et al., 2011; Hashima & Amato, 1994). Furthermore, several studies have demonstrated that ethnic disparities in diabetes management (e.g., poorer metabolic control among Latino versus Caucasian samples) were attributable to SES differences, rather than to ethnic differences (Lovejoy, Graczyk, O'Hare, & Neuman, 2000; Wang, et al., 2011).

McLoyd (1990) argues that impoverished parents experience more psychological distress than wealthier parents because they have to deal with frequent negative life events. This research also suggested that economic hardship is linked to diminished parent-adolescent relations. Drew et al. (2011) found that lower warmth in parent-adolescent relationships mediated associations between family income and poorer diabetes management in a mostly Caucasian sample of adolescents with type 1 diabetes.

Although Latino families provide high levels of support for other families, these support networks cannot outweigh all of the adversities associated with poverty (Leyendecker & Lamb, 1999).   The more stress a low-income Latina mother experiences, the more likely she is to complete the task for the adolescent, employ physical control or directives, or other behaviors that may be considered "firm," "stern," or "restrictive" (Zayas, 1994). Pachter, Auinger, Palmer, and Weitzman (2006) found that effects of chronic poverty on adolescent behavior problems in the Latino population were fully mediated through parenting and maternal depression. They suggested that different processes may be involved in explaining maternal depression associations with adolescent adjustment across racial ethnic groups, which may be related to sociocultural differences in family and childrearing practices. These findings suggest that socioeconomic factors must be taken into consideration when exploring psychological distress across ethnicities.

CHAPTER THREE

Rationale and Aims

Families of adolescents with type 1 diabetes face daunting challenges to manage the illness due to the complex biopsychosocial changes that occur during this developmental transition. Maternal depressive symptoms may pose additional challenges for these families, given the important role that mothers continue to play in facilitating her adolescent's diabetes management. Existing information regarding associations between maternal depressive symptoms and illness management outcomes of adolescents primarily comes from Caucasian populations, and there is no information on these associations in Latino populations. The proposed study investigated these associations in a more diverse sample, and examined differences across these ethnic groups while considering the context of SES. The information gleaned from this study may have important implications in both medical and mental health fields with regard to treatment of adolescent diabetes in that it may guide the incorporation of ethnic differences in parenting into healthcare outcomes.

The current study aimed to do the following:

1. Determine whether maternal depressive symptoms are associated with poorer metabolic control, lower adherence, and/or higher depressive symptoms in a diverse sample of adolescents with type 1 diabetes. I hypothesized that maternal depressive symptoms would be associated with poorer adolescent outcomes in both the Latino and Caucasian group.

2. Determine whether these associations differed as a function of Latino versus Caucasian ethnicity. Given both unique protective and risk factors among Latino families, I did not make specific hypotheses about whether ethnic differences would be observed.

3. Determine whether ethnic differences in the relationship between maternal depressive symptoms and health outcomes occurred independently of SES. I expected that SES differences between groups would be associated with maternal depressive symptoms and poorer adolescent outcomes, and would partially explain any ethnic differences in diabetes outcomes that were found.

CHAPTER FOUR

Methodology

Participants

Participants included 118 Caucasian and Latino adolescents with type I diabetes and their mothers, who completed surveys and interviews as part of a larger study of maternal involvement in diabetes management in a diverse population. Latino and Caucasian adolescents with type 1 diabetes and their mothers were recruited during a routine outpatient endocrinology clinic visit at Children's Medical Center Dallas. Adolescents between 10 and 15 years of age were recruited if they had been diagnosed with diabetes for at least 1 year, self-identified as either Caucasian or Latino, and could read and speak English or Spanish. Mothers were recruited because they are most often the primary caregiver in families with chronically ill children (Quittner et al., 1998). Participants were approached after being introduced to the study by a clinician in his or her clinic. They were invited to participate in a one-time visit and all study procedures were approved by the appropriate institutional review boards.

Demographic information was collected through a combination of maternal report, geographic identifiers from publicly available census data, and medical records. Adolescent participants were evenly divided by gender (54% female) and ethnicity (48% Latino), and averaged 13.24 (1.69) years of age. English was the primary language spoken in the home in 72% of the families. Adolescents had been diagnosed with diabetes for over a year, M (2.84) = 4.62 years, and twenty-five percent of the adolescents were on an insulin pump, with the remainder being treated on a multiple daily injection regimen. The majority of families reported having insurance (93%) which

covered medical expenses for the treatment of diabetes. Medicaid was reported as the insurance provider in fifty-five percent of this population and insurance provided through a parent's employment was reported in twenty-five percent of the sample. Mother's were primarily biological mothers (92%), married (75%), and 73% reported living in two parent households with the participating child's father. Twenty-five percent of mothers reported having been diagnosed with depression by a professional, of which forty-three percent reported currently taking medications for her depression.

Procedures

Adolescents and mothers came to a scheduled laboratory visit where informed consent and assent were obtained, and study measures were completed. This visit lasted approximately two to three hours. Reminder post-cards were mailed the week before and reminder phone calls were made the day before their scheduled session. Bilingual research assistants interacted with all Spanish speaking participants. During the session, mothers and adolescents independently completed questionnaire measures on a computer, as well as a structured interview. Where Spanish versions were not available, the actual measures were translated and back translated from English to Spanish by bilingual staff. Primary measures for the present study were obtained from the electronic surveys. All participants received a brief tutorial on how to complete surveys on the computer; participants who indicated discomfort in completing electronic surveys were provided with paper versions of the questionnaires. Both mother and child received $40 gift cards at the completion of the one-time assessment.

Assessment Measures

      Maternal Depressive Symptoms. Maternal depressive symptoms were measured using the Center for Epidemiological Study Depression Scale (CES-D; Radloff, 1977). The CES-D scale was developed for use in normal populations in studies of the epidemiology of depressive symptomatology. The CES-D asks respondents to rate the frequency with which 20 states or behaviors related to depression occurred during the past week (e.g., "I felt sad," "I felt that everything I did was an effort," "I enjoyed life"). Mothers were asked to rate the intensity of their experiences of each item in the past week on a scale ranging from (0) *rarely or none of the time (less than 1 day)* to (3) *most or all of the time (5-7 days)* and their answers were summed to generate scores. The possible range of scores is zero to 60, with higher scores indicating the presence of more symptomatology. Therefore, depressive symptoms used in this study were assumed to reflect the affective, cognitive and physical symptoms that characterize depression (i.e. sad mood, loss of interest, fatigue, low energy, poor concentration, feelings of self-reproach, changes in appetite, motor activity, or sleep patterns and hopelessness).

      The Spanish version of the CES-D has been reported to have sound psychometric properties when used with Latino immigrant populations (Grzywacz, Hovey, Selgiman, Arcury, & Quandt, 2006). The Spanish version of the CES-D has been used extensively in research with Latino populations, and demonstrates good reliability, validity and factor structure in a number of studies, (Fisher, Chesla, Mullan, Skaff, & Kanter 2001; Grzywacz et al., 2006; Guarnaccia, Angel, & Worobey, 1989; Heilemann, Lee, & Kury, 2002; Yang, & Jones, 2008). However, according to research by Nguyen, Clark, & Ruiz 2007, the major challenge in using the translated CES-D is its validity because of

possible ethnic bias. In their comparison of acculturated and non-acculturated Latinos, significant differences were found in the endorsement of 8 out of the 20 CES-D items, such that Latinos endorsed more somatic items. Although there may be differences in the endorsement of depressive symptoms across ethnicity, because of the literature supporting the use of the CES-D in Latinos, it was considered a good measure of depressive symptoms in this diverse population. For the current study, Cronbach's alpha was .58 for the entire sample (alpha = .57 and .55 for Caucasian and Latina mothers). This lower than desired reliability was unexpected based on published work among both Latino and Caucasian populations, especially including samples of parents with children with chronic illness. I examined whether internal consistency could be improved by deleting any items, but was unable to identify specific items that might improve reliability. It should be noted that few participants exceeded a score of 16, which has been used extensively as the cut-off point for high depressive symptoms on this scale (Radloff, 1977). Specifically, in this sample, six percent of mothers were above that score, of which 86 percent were Latinas.

Adolescent Outcome Measures. *Adherence.* The Self Care Inventory (SCI; La Greca et al., 1992) is a 14-item self-report measure of adherence that includes all aspects of the type 1 diabetes regimen including blood glucose monitoring, insulin administration, exercise, and diet. Participants are asked to record adherence to their regimen over the past month using a scale ranging from 1) *never did it* to 5) *always did it, without fail*. With the assistance of a certified diabetes educator, the tool was adapted by adding two items and modifying the wording of some items to reflect current standards of diabetes care (e.g. calculating insulin doses based on carbohydrate content of meals or snacks).

The SCI is commonly used in research on children and adolescents with type 1 diabetes, provides an assessment of adherence similar to that of a more time-intensive interview method for measuring adherence (La Greca et al., 1992), and is correlated with metabolic control indices (La Greca et al., 1990; Lewin, La Greca, Geffken, Williams, Duke, Storch, & Silverstein, 2009). The SCI showed adequate internal consistency in the present study (alpha = .85 for adolescent report in the entire sample; .86 in Latino adolescents and .85 in Caucasian adolescents).

Adolescent Depressive Symptoms. Depressive symptoms in the adolescent were measured using the Children's Depression Inventory (CDI, Kovacs, 1980). The CDI was developed as a self-report screening measure of depressive symptoms in school-aged children and adolescents, including disturbance in mood and hedonic capacity, self-evaluation, vegetative functions, and interpersonal behaviors over the past 2 weeks. It contains 27 multiple choice items that yield total scores from 0 to 54, with higher scores reflecting greater symptomatology. The CDI has been normed on 7-17 year olds and concurrent and discriminant validity has been established with broad samples of children with known mental health problems; the scale has been commonly used in studies of children and adolescents with type 1 diabetes (Kovacs et al., 1990). Cronbach's alpha in the present sample was 0.84 for the entire sample; 0.86 in Latino adolescents and 0.80 in Caucasian adolescents.

Metabolic control. Metabolic control in adolescents was indexed by glycosolated hemoglobin (HbA1c) recorded in medical records as part of their routine check-up. HbA1c represents the average blood glucose over the prior 2-3 months, with higher levels indicating poorer metabolic control. HbA1c is the current standard to index whether

diabetes treatment goals are being achieved with higher scores indicating poorer

management. The present study utilized the HbA1c measure taken in the clinic visit just

prior to the research assessment to ensure the index reflected diabetes control nearest to

the time of the assessment. The average HbA1c score for the present sample (M (1.55) =

8.55), was above the American Diabetes Association recommendations for HbA1c levels

among adolescents in our age range (i.e., 7.50 %) (American Diabetes Association,

2010).

Socioeconomic status variables. Indicators of SES were obtained from publicly available

census data bases and from maternal reports. Neighborhood estimates of SES variables

were collected from publicly available geographical databases containing 2000 census

data based on each subject's listed street address. For neighborhood estimates of income,

median family income was obtained through this census tract data. To characterize

neighborhood ethnic composition, percentage of Latino population was collected. These

neighborhood SES indicators were only available on N = 109 participants, because 9 of

the addresses listed were post office boxes, for which such data were unavailable.

Multiple imputation procedures (Rubin, 1987) through Statistical Package for the Social

Sciences version 19 (SPSS 19) were used to estimate missing values through inferring

responses for missing values in multiple iterations and then pooling the results.

Additional markers of individual SES were obtained from maternal report of her

education level and her report of their annual household income. Mothers were asked

what the highest level of education they had completed and were allowed to select among

the following options: less than 7th grade, junior high school (9th grade), partial high

school (10th or 11th grade), high school graduate (private, parochial, or public), obtained

GED, partial college (at least one year), associate's/vocational degree, bachelor's degree, or graduate professional degree (Masters, M.D., Ph.D.) For data analysis these categories were recoded into four categories (1) pre-high school, (2) high school, (3) some college, and (4) college and beyond. To assess maternal report of income, mothers were asked to approximate their annual household income by endorsing one of the following options: less than $5,000, $5,000 to $9,999, $10,000 to $14,999, $15,000 to $24,999, $25,000 to $49,999, $50,000 to $74,999, $75,000 to $100,000, or more than $100,000.

CHAPTER FIVE

Analysis Plan

The data were preliminarily evaluated for normality and outliers, and differences across Latino and Caucasian samples were examined through independent t-tests and chi-square tests of independence. In these t-test analyses, I initially examined whether I could assume equality of variance across groups. When the assumption of homogeneity of variance was not met, I adjusted for differing variances. Differing degrees of freedom across analyses reflect this procedure. I also evaluated for multivariate outliers and discovered one subject who was an outlier on both child and maternal depression. Because including this subject altered the results, the subject was dropped from all analyses.

First, I examined correlations among all study variables. This allowed me to address the first aim of determining whether maternal depressive symptoms were associated with youth diabetes outcomes (i.e., depressive symptoms, adherence, and metabolic control) in the full sample. Correlations also provided initial information about demographic, income, and illness variables that needed to be considered in further analyses. Second, I examined whether ethnicity moderated these associations using hierarchical regression analyses. Finally, to determine whether the associations occurred independent of SES, these regression analyses were repeated while covarying SES in Step 1.

CHAPTER SIX

Results

Preliminary Analyses

Descriptive information on study variables for the full sample, as well as statistical comparisons between Caucasian and Latino dyads are reported in Table 1. Latina mothers reported significantly higher levels of depressive symptoms than Caucasian mothers and, not surprisingly, had lower scores on all indicators of SES. Importantly, however, there were no ethnic group differences on mothers' marital status, adolescent age, gender, time since diagnosis, or type of insulin regimen. The two ethnic groups also did not differ on any adolescent outcome variable. These data support the need to covary indicators of SES to understand the associations between ethnicity and adolescent outcomes.

There were no Latino versus Caucasian ethnic group differences on adolescent reports of depression, adolescent reports of adherence, metabolic control, adolescent age, adolescent gender, illness duration, or insulin pump status. However, there were significant group differences on maternal depressive symptoms, with Latina mothers reporting more depressive symptoms than Caucasian mothers, $t(112) = 2.48$, $p = .015$. I also found significant differences between groups in numerous indicators of SES, including neighborhood information provided from census data. Latina mothers reported lower education, $X^2 = (3, N=118)$ 37.35, $p < .001$, and lived in neighborhoods with lower median family income $t(98) = -4.74$, $p < .001$. Latino families were also more likely to live in neighborhoods with a higher minority population than Caucasian families $t(65) =$

4.43, $p = < .001$. The full distribution of maternal report of household income and

education level are presented by ethnicity in Figures 1 and 2.

Maternal Depressive Symptoms Associations with Adolescent Outcomes in a

Diverse Sample

The first aim of this study was to determine whether maternal depressive

symptoms were associated with poorer metabolic control, lower adherence, and/or more

depressive symptoms in this diverse sample of Caucasian and Latino adolescents with

type 1 diabetes. Correlation analyses were used to explore the relationship between

maternal depressive symptoms and adolescent outcomes. Correlations among all study

variables are displayed in Table 2. Maternal depressive symptoms were again associated

with being Latina versus Caucasian, and with lower scores on all indicators of SES. At

this zero-order correlation level, however, there were no associations between maternal

depressive symptoms and any of the adolescent diabetes-related outcomes. This absence

of an association was somewhat surprising, but may be expected if other variables such

as ethnicity moderate the relationship between maternal depressive symptoms and

adolescent outcomes. The possibility that ethnicity moderates these associations was

examined in the primary analyses for Aim 2 below.

In addition to ethnicity, age and gender were examined as moderators for several

reasons. Consistent with research on the challenges of diabetes management across

adolescence, older adolescents displayed poorer adherence and metabolic control. These

correlations, combined with findings that maternal depression associations with

adolescent outcomes were moderated by age-related declines in maternal responsibility

(Wiebe et al., 2011), led me to examine age (in addition to ethnicity) as a second

moderator in the primary analyses below. Gender was also associated with diabetes management, such that females reported poorer adherence compared to males. Because mother-daughter versus mother-son relationships may be quite different during adolescence (Russel & Saebel, 1997), especially among Latino populations (Cota-Robles & Gamble, 2006), adolescent gender was considered as a second moderator in the primary analyses below. Analyses examining ethnicity and age as moderators of maternal depressive symptoms were conducted separately from analyses examining ethnicity and gender moderators due to the relatively small sample of Latino dyads.

Ethnic Differences in Associations of Maternal Depressive Symptoms with Adolescent Outcomes

The second aim was to determine whether maternal depressive symptoms had different associations with adolescent diabetes-related outcomes as a function of Latino versus Caucasian ethnicity. Using hierarchical linear regression analyses, I evaluated whether there were interactions between maternal depression, ethnicity, and age (or gender) predicting each of the adolescent outcomes. For these analyses, interaction terms were created by multiplying mean centered (age, maternal depressive symptoms) or dummy coded (gender, ethnicity) variables. Then, in separate analyses for each adolescent outcome, main effects were entered on Step 1 (e.g., maternal depression, ethnicity, age), all two-way interactions were entered on Step 2 (e.g., maternal depression X ethnicity, maternal depression X age, ethnicity X age), and the three-way was entered on Step 3. At each step, I examined the total variance and change in variance explained, as well as the significance value for each term in the regression equation.

Moderation by ethnicity and age. As reported in Table 3 (see Step 3), maternal reports of depressive symptoms were associated with higher child reports of depression, $t(108) = 1.98$, $p = .05$, but this was moderated by both a two-way interaction with child age, $t(105) = 2.13$, $p = .036$, and a three-way interaction with age and ethnicity, $t(104) = -2.05$, $p = .043$. The source of this interaction was determined by completing the regression equation for ± 1 standard deviation for maternal depression and adolescent age, and the dummy codes for ethnicity. As displayed in Figure 3, the expected positive association between mother and adolescent depressive symptoms was found only among older Caucasian adolescents. The test of simple slopes was significant in this group $t(108) = 2.827$, $p = .0056$. There was no association among younger Caucasian participants, or among older and younger Latino participants and slopes were not significantly different from zero, $p > .76$.

Similar regression analyses were conducted for adolescent reports of adherence and metabolic control. As displayed in Table 4, there was a significant effect for adolescent age predicting adherence, such that older adolescents reported poorer adherence than younger adolescents. However, there were no main effects or interactive effects for maternal depressive symptoms or ethnicity predicting adherence. Similarly, as displayed in Table 5, older adolescents also displayed poorer (i.e., higher) HbA1c compared to younger adolescents. Maternal depressive symptoms were not associated with metabolic control at Step 1 of the regression analysis, and did not interact with adolescent age or ethnicity at any Step. However, when all regression terms were entered simultaneously at Step 3, maternal depressive symptoms were associated with poorer metabolic control.

Moderation by ethnicity and gender. Similar hierarchical regression analyses were conducted examining ethnicity and gender as moderators of maternal depressive symptom associations with adolescent outcomes. Very few significant effects were found. Specifically, there were no main effects or interaction effects for any predictor variable predicting either adolescent depression or adherence. In fact, the total amount of variance explained at each step of the analysis was not statistically different from zero. Analyses of metabolic control yielded one significant finding indicating that boys had poorer metabolic control than girls, $b = .199$, $t\,(100) = 2.031$, $p = .045$. However, gender did not interact with either ethnicity or maternal depressive symptoms in any analysis, $p > .10$.

The Role of SES. The third and final aim of this project was to determine whether ethnic differences in the relationship between maternal depression and adolescent diabetes-related outcomes occurred independently of SES. Multiple metrics of SES were collected including census tract neighborhood estimates of income, percentage of Latino population in the neighborhood, median family income, maternal report of her education level and maternal report of annual household income. As noted in Tables 1 and 2, lower values on these indicators were consistently found in Latino compared to Caucasian participants, as well as among mothers reporting higher symptoms of depression. These associations support the importance of statistically controlling the influence of SES. Interestingly, however, the SES indicators were generally unrelated to adolescent outcomes. The socioeconomic indicator that had the strongest association with outcome variables was median family income collected through census data. This variable was also associated with both ethnicity and maternal depressive symptoms and, thus, was

selected as the covariate for Aim 3 analyses. Multiple imputation procedures were used to estimate nine missing values in our sample. Five imputed data sets were generated, and regression analyses were conducted on each set. Results reported below reflect pooled results obtained from SPSS 19.

When median family income was covaried in the regression examining ethnicity and age as moderators of maternal depressive symptoms predicting adolescent depression, the prior significant effects remained. In particular, the three way interaction between maternal depression, ethnicity, and adolescent age was significant, $b = -.505$, $t(105) = -1.97$, $p = .049$. Thus, these analyses suggest that the effects of maternal depression among older Caucasian vs. Latino adolescents are not a function of differences in median family income. This was also true when we examined whether the main effect for maternal depressive symptoms predicting HbA1c remained after median family income was covaried, $b = .505$, $t(105) = 1.97$, $p = .049$. This pattern of results suggests that the association between maternal depressive symptoms and higher (poorer) HbA1c is not a function of shared variance with median family income.

Supplemental analyses

Although expected associations between maternal reports of depressive symptoms and adolescent diabetes management were not found, there were ethnic group differences in scores on the maternal depression measure. Additional analyses were conducted to further understand these findings.

Analyses were conducted to determine how many mothers had reported depressive symptoms over the clinical cut-off score of 16. Only six percent of mothers in this sample were above that score, of which eighty-six percent were Latinas. A chi-

square test examining the relation between being Latina and reporting depressive symptoms above the clinical cutoff was significant, $X^2 = (1, N=117)$ 4.51, $p = .034$. Although Latina mothers were significantly more likely to have clinically relevant levels of depression than Caucasian mothers in this sample, I may not have accessed clinically meaningful levels of depression in general. Furthermore, my ability to detect maternal depression effects may also have been limited because forty-one percent of the mothers who reported having been diagnosed with depression by a professional were currently receiving medication for depression. Of the 16 mothers in this sample who reported taking medications, seven were Latina and nine were Caucasian; significant ethnic differences were not found.

It may also be that there were ethnic group differences in the manner in which depressive symptoms recorded on the CES-D are experienced or endorsed. For example, some research suggests that Latino samples endorse more somatic aspects of depressive symptoms (Cardemil et al., 2007; Guarnaccia, Angel, & Worobey, 1989; Kim, Chiriboga, & Jang, 2009; Noel, 2010). This is relevant to the current findings if some subscales are more disruptive for parenting an adolescent with diabetes. This possibility was examined by calculating scores for the subscales that have been identified for the CES-D measure (Nguyen, Clark, & Ruiz 2007; Guarnaccia et al., 1989). The CES-D subscales defined in the literature include: (a) the depressed affect scale, which has questions focusing on feeling sad and not being able to 'shake the blues' as well as experiencing crying spells; (b) the positive affect scale, comprised of the reverse-coded items that capture a lack of a positive outlook; (c) the somatic activity scale, that includes questions about bodily states, lack of energy or appetite, restless sleep and difficulty doing regular activities; and

(d) the interpersonal scale, which is focused on the person's perception that other people have a negative reaction to them.

A t-test of independent samples indicated Latina mothers were more likely to endorse factors related to depressed affect *M (SD)* = 1.12 (2.35) vs. 0.17 (.46), *t*(56) = 2.91, *p* = .005, somatic activity *M (SD)* =1.23 (1.61) vs. 0.43 (1.18), *t*(95) = 2.97, *p* = .004, and interpersonal items *M (SD)* = .19 (.44) vs. 0.03 (.18), *t*(67) = 2.41, *p* = .018, as compared to Caucasian mothers. I also found that none of the subscale scores were correlated with adolescent outcomes, -.124 < r < .133, p > .10. Thus, there was little evidence that the higher depressive symptom scores among Latina mothers reflected a specific aspect of depression.

The reliability of each subscale was analyzed for the overall group and in Latinas and Caucasian mothers separately to determine if one particular subscale had better internal consistency, especially for Latina mothers. One subscale, positive affect, had higher internal consistency than the overall scale (i.e., α > .58) for both ethnic groups. The original regression analysis was rerun determine if maternal reports of how positive affect were associated with higher child reports of depression across age and ethnicity. The age by maternal positive affect by ethnicity interaction was marginally significant *t*(104) = 1.72, *p* = .085. Thus, there was no evidence that an index of maternal depression that is more reliable yields clearly different findings.

Finally, I was interested in determining if there were ethnic differences in CES-D scores after statistically controlling for SES differences. This potential confound is important to consider because lower SES is related to higher levels of depressive symptoms in general (Lovejoy et al., 2000), and these SES-depressive symptom

associations were found in the present sample. Regression analyses were conducted by regressing maternal depressive symptoms onto ethnicity and median family income. This revealed that the difference between ethnic groups in reports of maternal depressive symptoms remained after controlling SES, b = 1.67, $t(105) = 2.47$, p = .015.

CHAPTER SEVEN

Discussion of Findings

The present study is among the first to examine adolescent type 1 diabetes management in a diverse sample of Caucasian and Latino youth, and is the only study I am aware of to examine the role of maternal depressive symptoms in type 1 diabetes management among Latinos. The findings add to the literature by replicating in this diverse sample that adolescents display poorer diabetes management with increasing age. Older adolescents displayed poorer metabolic control and adherence compared to younger adolescents, similarly across ethnic groups. Not surprisingly, Latino families occupied lower SES strata than did Caucasian families (e.g., lower education and income), and these SES indicators were associated with poorer metabolic control. Latino youth, however, did not show poorer diabetes management across adolescence than Caucasian youth, despite their lower SES. Furthermore, although Latina mothers endorsed higher levels of depressive symptoms than Caucasian mothers, maternal depressive symptoms were generally unrelated to adolescent diabetes management. One exception to this pattern was that maternal depressive symptoms were associated with heightened levels of adolescent depression, but this association was primarily evident among older Caucasian youth.

A primary goal of the present study was to examine maternal depressive symptom associations with adolescent outcomes. In contrast to expectations, maternal depressive symptoms were generally unrelated to important indicators of adolescent diabetes management.   Although maternal depression was not found to have a consistent association with adolescent report of adherence, depression, or with metabolic control,

there were some intriguing findings that deserve additional research. The main evidence of association was that maternal depressive symptoms were associated with higher report of depressive symptoms among older Caucasian adolescents, but not among older Latino/a, or younger adolescents. The age related effect may reflect the developmental course of depressive symptomology, in that depression begins to escalate across adolescence, at least among girls (Korbel et al., 2007; Reed, 2007). As adolescents become more vulnerable to depression, the influence of mother's depressive symptoms may become more apparent through modeling or even genetic risks (Downey & Coyne, 1990).

The fact that this age-related association was found for Caucasians and not Latinos is intriguing, and deserves additional attention in future research. It is possible that this pattern reflects aspects of changing parent-child relationships and developmental needs throughout adolescence. For example, Wiebe et al., (2011) found maternal depressive symptoms were associated with heightened parental responsibility and slower decline in parental responsibilities for diabetes management in a primarily Caucasian sample of adolescents with type 1 diabetes. She suggested that maternal depression may undermine sensitivity to child developmental needs. If so, Caucasian adolescents with more depressed mothers in the present sample may not be receiving developmentally sensitive parenting that supports autonomy and independence. The absence of associations in the Latino adolescents could reflect ethnic differences in expectations for parenting and adolescent development. For example, Romero and Ruiz (2007) found in a study of Latino youth that the value of familism was associated with higher parental monitoring, and that both family closeness and parental monitoring were associated with

fewer adolescent risky behaviors. It is possible that in Latino families, the expectation of adolescent autonomy and independence comes second to the Latino value of family closeness. These intriguing possibilities are only speculation at this time, and should be considered with caution given that the finding was not predicted a priori, but deserve additional attention if this finding is replicable.

Despite these intriguing findings, the weight of evidence did not replicate the association between maternal depressive symptoms and poorer adolescent outcomes that has been reported in the literature (Jasser & Grey, 2010; Chaney et al., 1997; Drotar, 1997; Kovacs, Goldston et al., 1997). This could be attributed to the infrequent endorsement of depressive symptoms by the mothers who completed this survey, resulting in a limited range of maternal depressive symptoms. It is possible that the self-report measure of CES-D did not adequately capture the symptomotology of interest, potentially because mothers in this sample may have been defensive about reporting depressive symptoms in the context of a survey regarding the care of her child's diabetes. It was the experience of this researcher that mothers were more willing to report distress informally when discussing the challenges related to diabetes care, than what is being reported on the CES-D. Perhaps mothers wanted to present themselves as doing better than they really are. This phenomenon is suggestive of underreporting in our sample, especially considering the literature which supports that mothers of children with type 1 diabetes are more likely to be depressed than mothers of children without diabetes. Some samples using this population have found rates as high as 28% of mothers scoring above the clinical cut-off score on the CES-D (Streisand et al., 2005; Kovacs, Goldston et al.,

1997; Mullins et al., 2004; Melin et al., 2004; Wiebe et al., 2011). This lack of findings

could also be related to a modest sample size in general and among Latinas, in particular.

Significant differences were observed across ethnic groups on various SES

indicators, but these indicators were mostly unrelated to adolescent outcomes. Although

Latino youth had lower SES, and lower SES is often associated with poorer illness

management (Wang, et al., 2011), there was not a strong pattern of ethnic differences in

adolescent outcomes in our sample. These findings are somewhat surprising considering

the significant disparity in SES between groups and may be suggestive of protective

factors in the Latino group. This possibility is consistent with the Hispanic paradox,

wherein Hispanic populations do not appear to show the expected detriments of low SES

compared to other populations (Palloni, & Morenoff, 2001).   Findings that adolescent

diabetes outcomes were similar across ethnic groups, despite differences in SES, could

reflect that participants received medical care at a not-for-profit hospital devoted to

providing equal care regardless of ability to pay.

Like the lack of findings related to SES, there was a general absence of ethnic

differences in the present study. This is unexpected given findings in the literature on the

ethnic influences on parenting and family relationships suggests (Halgunseth et al., 2006;

Smetana et al., 2006). It is possible that maternal depressive symptoms mean something

different in Latino families versus Caucasian families, considering Latina mothers

endorsed higher rates of depressive symptoms in this sample. Perhaps the lack of

differences in adolescent outcomes between groups is due to the Latino characteristic of

familism which has been associated with better physical and emotional health of

adolescent Latinos (Dumka, Roosa, & Jackson, 1997; Hill, Bush, & Roosa, 2003). It is

possible that different processes are involved in adolescent health outcomes in the Latino population, which may be related to sociocultural differences, as is supported in the literature (Pachter et al., 2006; Dumka et al., 1997; Hill et al., 2003). Future research may benefit from focusing on identifying these protective factors to determine if cross-cultural interventions can be developed to ensure better outcomes for adolescents with type 1 diabetes.

Limitations and conclusions

The present study has several limitations that require consideration when interpreting the results. While the sample was diverse, it was a relatively small participant sample to examine fully what are likely to be complex interrelationships among ethnicity, SES, adolescent age or gender. This, along with the low endorsement of depressive symptoms, may have limited our ability to detect the associations of maternal depression, adolescent age, gender or ethnicity with adolescent health outcomes. The associations of poorer outcomes with older adolescents suggest that a larger age range in the adolescent population might better capture the time of risk for adverse outcomes. Patterns of data suggest that future studies with a larger subject pool and perhaps older adolescents may yield more powerful results.

There are also limitations with regards to the measures utilized in this study. Although all measures were translated and back-translated into Spanish, most measures were developed for use with English-speaking Caucasians. The self-report measure of ethnicity included a heterogeneous group of Latino families from different countries of origin, which may have weakened findings in this group. More significant are the findings of low internal-consistency in the CES-D, and very low endorsement of

depressive symptoms in this sample which could have placed limits on our ability to detect associations. One suggestion for future researchers studying this population is to spend more time developing rapport and setting the participants at ease about how this information will be used. Although informed consent was obtained, and families were reassured that their information would remain private, perhaps more time spent with mothers before beginning the survey would have encouraged them to open up about their experiences. Nevertheless, reports of depressive symptoms were significantly higher for Latina than for Caucasian mothers, making the association between maternal and child depressive symptoms in Caucasian youth all the more striking.

This study contributes to the understanding of the correlates and implications of maternal depressive symptoms in a diverse sample of adolescents with type 1 diabetes. Findings suggest that different processes may be involved in how maternal depression is associated with adolescent health outcomes across ethnic groups. Further research must replicate the finding that maternal and adolescent depressive symptoms are associated only in Caucasian youth. If replicable, the potential for understanding protective factors among Latino youth may prove fruitful for enhancing the health of this vulnerable population.

Table 1

Descriptive Information of the Overall Sample and Differences Across Ethnic Groups

	Overall Sample N = 118 M (SD)	Latino N = 56 M (SD)	Caucasian N= 62 M (SD)
Maternal report of depressive symptoms	10.48 (3.60)	11.4 (4.18) *	9.72 (2.83) *
Adolescent report of depressive symptoms	8.36 (6.09)	9.11 (6.83)	7.68 (5.32)
Adolescent report of adherence	4.03 (0.68)	3.98 (0.78)	4.09 (0.57)
Metabolic control	8.55 (1.55)	8.77 (1.67)	8.35 (1.43)
% Married	75%	66%	84%
% Mothers graduated high school	81%	69% **	93% **
Age of adolescent	13.24 (1.69)	13.31 (1.78)	13.19 (1.63)
Gender of adolescent (% F)	54%	62%	46%
Time since diagnosis	4.62 (2.84)	4.31 (2.45)	4.90 (3.14)
% on insulin pump	25%	20%	31%
% maternal report of income < $25,000/yr.	32%	50% **	16% **
Census tract median family income (N = 109)	61,700 (26.94)	50,493 (18.51) **	71.927 (28.10) **
% of neighborhood classified as Latino (N = 109)	19 % (21)	28 % (26) **	11 % (10) **

Note. $*= p < .05$, $** = p < .001$

Table 2

Correlation Matrix Among Maternal Depression, Illness Outcome, and Socioeconomic Variables

	2	3	4	5	6	7	8	9	10	11	12	13
1) Maternal report of depressive symptoms	0.076	-0.046	0.107	-0.284**	-0.095	0.132	-0.008	0.100	-0.367***	-0.283**	-0.313**	0.236*
2) Adolescent report of depressive symptoms		-0.492***	0.194*	-0.137	0.130	0.115	0.111	0.086	-0.057	-0.027	-0.184+	0.098
3) Adolescent report of adherence			-0.214*	0.094	-0.241**	-0.200*	0.044	-0.117	0.111	-0.100	0.152	-0.070
4) Metabolic control				-0.138	0.197*	-0.151	0.224*	0.226*	-0.174+	-0.114	-0.220*	0.181+
5) Ethnicity (1=Latino, 2= Caucasian)					-0.047	-0.150	0.098	-0.132	0.572***	0.515***	0.411***	-0.403***
6) Age of adolescent (in yrs)						-0.002	0.082	0.065	-0.022	0.039	-0.031	0.164
7) Gender of adolescent (1=Male, 2=Female)							-0.020	0.055	-0.235*	-0.153	-0.248**	0.101
8) Time since diagnosis (in yrs)								-0.305**	0.069	0.165+	0.112	-0.003
9) Pump status (1=Yes, 2 = No)									-0.248*	-0.176+	-0.243*	0.143
10) Mother's education (1=PreHS, 2= HS, 3=Some college, 4= College +)										0.455***	0.487***	-0.529***
11) Maternal report of income											0.505***	-0.289***
12) Census tract median family income (N= 109)												-0.510***
13) % of neighborhood classified as Latino (N= 109)												

Note: $p = <.05*$, $p = <.01**$, $p = <.001***$, $p = <.10 +$

Table 3			
Hierarchical Regression Analyses Testing Maternal Depressive Symptoms X Ethnicity X Age Interactions Predicting Adolescent Depressive Symptoms			
	Adolescent depressive symptoms		
Predictor Variables	Unstandardized Coefficient B	*SE*	β
Step 1	$\Delta R^2 = 0.030$, F (3,108) = 1.124		
Maternal depressive symptoms	0.104	0.193	0.053
Ethnicity	1.176	1.189	0.098
Age	0.421	0.341	0.118
Step 2	$\Delta R^2 = 0.023$, F (3,105) = .978		
Maternal depressive symptoms	0.577	0.391	0.295
Ethnicity	0.799	1.222	0.066
Age	0.265	0.494	0.074
Maternal depressive symptom X ethnicity	-0.610	0.449	-0.262
Maternal depressive symptom X age	0.065	0.103	0.063
Age X ethnicity	0.287	0.711	0.057
Step 3	$\Delta R^2 = 0.037$, F (1,104) =1.464**		
Maternal depressive symptoms	0.790*	1.981	0.403*
Ethnicity	0.509	0.420	0.042
Age	0.649	1.246	0.181
Maternal depressive symptom X ethnicity	-0.828	0.455	-0.356
Maternal depressive symptom X age	0.501**	0.236	0.485**
Age X ethnicity	0.003	0.714	0.001
Maternal depressive symptom X age X ethnicity	-0.536**	-0.459	0.261**
Note. $* = p = .05$, $** = p \leq .05$			

Ethnicity was dummy coded as Caucasian = 0, Latino = 1. When ethnicity was dummy coded as Caucasian = 1, Latino = 0, the main effect was not significant.

Table 4			
Hierarchical Regression Analyses Testing Maternal Depressive Symptoms X Ethnicity X Age Interactions Predicting Adolescent Reports of Adherence			
	Adolescent report of adherence		
Predictor Variables	Unstandardized Coefficient B	*SE*	β
Step 1	$\Delta R^2 = 0.074$, F (3,107) = 2.833**		
Maternal depressive symptoms	-0.010	0.021	-0.045
Ethnicity	-0.048	0.132	-0.036
Age	-0.105**	0.038	-0.262**
Step 2	$\Delta R^2 = 0.023$, F (3,104) = 1.845		
Maternal depressive symptoms	0.010	0.043	0.045
Ethnicity	-0.061	0.135	-0.045
Age	-0.054	0.054	-0.135
Maternal depressive symptom X ethnicity	-0.029	0.049	-0.111
Maternal depressive symptom X age	-0.004	0.011	-0.037
Age X ethnicity	-0.102	0.078	-0.180
Step 3	$\Delta R^2 = 0.002$, F (1,103) =1.607		
Maternal depressive symptoms	0.004	0.045	0.019
Ethnicity	-0.053	0.137	-0.039
Age	-0.065	0.058	-0.161
Maternal depressive symptom X ethnicity	-0.023	0.051	-0.088
Maternal depressive symptom X age	-0.016	0.026	-0.142
Age X ethnicity	-0.094	0.080	-0.166
Maternal depressive symptom X age X ethnicity	0.015	0.029	0.114
Note. ** = $p \leq$ .05			

Table 5			
Hierarchical Regression Analyses Testing Maternal Depressive Symptoms X Ethnicity X Age Interactions Predicting Adolescent Metabolic Control			
	Adolescent metabolic control		
Predictor Variables	Unstandardized Coefficient B	*SE*	β
Step 1	$\Delta R^2 = 0.070$, *F* (3,109) = 2.721**		
Maternal depressive symptoms	0.049	0.046	0.104
Ethnicity	0.272	0.304	0.087
Age	0.204**	0.086	0.220**
Step 2	$\Delta R^2 = 0.021$, *F* (3,106) = 1.770		
Maternal depressive symptoms	0.170	0.100	0.361
Ethnicity	0.179	0.312	0.057
Age	0.138	0.126	0.149
Maternal depressive symptom X ethnicity	-0.145	0.112	-0.265
Maternal depressive symptom X age	0.007	0.023	0.032
Age X ethnicity	0.113	0.182	0.088
Step 3	$\Delta R^2 = 0.013$, *F* (1,105) = 1.746		
Maternal depressive symptoms	0.204*	0.103	0.434*
Ethnicity	0.131	0.314	0.042
Age	0.200	0.135	0.216
Maternal depressive symptom X ethnicity	-0.186	0.116	-0.340
Maternal depressive symptom X age	0.078	0.061	0.345
Age X ethnicity	0.069	0.185	0.053
Maternal depressive symptom X age X ethnicity	-0.082	0.066	-0.336
Note. * = p = .05, ** = $p \leq$ .05			
Ethnicity was dummy coded as Caucasian = 0, Latino = 1. When ethnicity was dummy coded as Caucasian = 1, Latino = 0, the effect for Maternal depressive Symptoms was not significant.			

Demographic and Health Information

Completed by Researcher

1. Mother is the participating child's:

   ___ Biological mother
   ___ Stepmother
   ___ Adopted mother
   ___ Other relationship (please specify) _____

2. Who is the primary caretaker for the child participating in this study?
   ___ Myself (mother)
   ___ Partner/spouse (father)
   ___ Grandparent
   ___ Other (please specify) _____

3. The father who mother will be answering questions about:
   ___ Child does not have regular contact with father (see or talk to by phone every week)
   ___ Biological father
   ___ Stepfather
   ___ Adopted father
   ___ Mother's boyfriend who lives with them
   ___ Mother's boyfriend who does not live with them

4. Does this father live with child?
   ___ Yes
   ___ No
   ___ Not applicable

5. Do you have a partner/spouse living in your home?
   ___Yes
   ___ No
   ___ Same as above
   ___ Different than above

6. The grandparent who mother will be answering questions about:
   ___ Child does not have any living grandparents

___ Mother's mom
___ Mother's dad
___ Father's mom
___ Father's dad

Completed by Mother

The following survey is designed for you to tell us information about yourself, your child, and how you help your child manage his/her diabetes care. Please read all questions carefully and answer them as honestly as possible. Please remember that all of your responses will be kept private and will not be shared with your child.

First, we would like to ask you some questions about your family and homelife.

1. What is your birthday (mm/dd/yyyy)? _____

2. What is your current marital status?
____ Married

____ Divorced

____ Separated

____ Widowed

____ Remarried

____ Living with unmarried partner

____ Single

3. What is the duration of your current marital status (in years - specify number)? For example, you have been married 5 years, or divorced 10 years. If you have always been single then put "NA" in the box below to represent that this item is not applicable.
_____

4. We would like to know all of the people who are currently living with you and your child and how long they have been living with you. Please check yes to all that apply and supply the duration (in years) that they have been living with you. We will ask about siblings in the next question. Mark "NA" if you do not have a particular type of relative in your life.

	Is this person currently living in your home?			How long have they been living in your home (in years)?
	Yes	**No**	**NA**	
Biological Father				
Stepfather				
Adopted Father				
Unmarried partner				
Grandmother				
Grandfather				
Aunt or Uncle				
Cousins				

5. Please tell us about any additional relatives or people who may be living in your home (for example, friends, renters, teen's boyfriend/girlfriend). State their relationship and the duration of time they have been living in your home (for example, my child's boyfriend for the past 6 months).

_____

6. Please tell us specific information about each child that you have had, including the child participating in this study. If you have more than 10 children then enter additional children in the space provided below.

	Age	**Gender**		**Does this child live with you?**		**Does this child have type 1 diabetes?**		**Other chronic illness?**
	(in years)	Male	Female	Yes	No	Yes	No	(specify)
1								
2								
3								
4								
5								
6								
7								
8								

9							
10							

7. Provide the above information for any additional children.

_____

8. Do you consider yourself:
___ Catholic
___ Jewish
___ Protestant
___ Buddhist
___ Muslim
___ Hindu
___ Other religion (please specify) _____
___ Not a religious person

9. In general, how often do you attend religious services?
___ 4 or more times per month (once a week)
___ 2 to 3 times per month
___ 1 time per month
___ Less than once a month
___ Occasionally during the year
___ Never

10. Is English the primary language spoken in your home? If you marked no, please specify the primary language spoken in your home.

___ Yes

___ No (please specify) _____

11. Please indicate all of the other languages other than English that are spoken in your home (check all that apply).
___ No other languages are spoken in my home
___ Spanish
___ Japanese
___ German
___ Italian
___ Chinese
___ French

___ Other (please specify) _____

12. What is the highest level of education you have completed?
___ Less than 7th grade
___ Junior high school (9th grade)
___ Partial high school (10th or 11th grade)
___ High school graduate (private, parochial, or public)
___ Did not graduate high school but obtained GED
___ Partial college (at least one year)
___ Associate's/vocational degree
___ Bachelor's degree
___ Graduate professional degree (Masters, M.D., Ph.D.)

13. What is your approximate household income?
___ Less than $5,000
___ $5,000 to $9,999
___ $10,000 to $14,999
___ $15,000 to $24,999
___ $25,000 to $49,999
___ $50,000 to $74,999
___ $75,000 to $100,000
___ More than $100,000

14. Please provide information about your current occupational status (check all that apply). If you mark yes, please tell us the duration (in years) for that occupational status.

	Does this describe your occupational status?		Duration
	Yes	No	(in years)
Employed			
Unemployed			
Stay-at-home mother			
Retired			
Volunteer time			
Looking for work			
Not looking for work			
Leave of absence (medical leave, temporary disability…)			
Permanent disability			

15. Please describe your current line of work. If you are currently not working, please describe your occupational history. Provide a job title and brief description of the work.

_____

_____

_____

16. Approximately how many hours do you work outside of the home each week?

_____

17. What is the highest level of education your partner/spouse has completed?
___ Less than 7th grade
___ Junior high school (9th grade)
___ Partial high school (10th or 11th grade)
___ High school graduate (private, parochial, or public)
___ Did not graduate high school but obtained GED
___ Partial college (at least one year)
___ Associate's/vocational degree
___ Bachelor's degree
___ Graduate professional degree (Masters, M.D., Ph.D.)

18. Please provide information about your partner/spouse's current occupational status (check all that apply). If you mark yes, please tell us the duration (in years) for that occupational status.

	Does this describe your partner/spouse's occupational status?		Duration
	Yes	No	(in years)
Employed			
Unemployed			
Stay-at-home mother			
Retired			
Volunteer time			
Looking for work			
Not looking for work			
Leave of absence (medical leave, temporary disability…)			
Permanent disability			

19. Please describe your partner/spouse's current line of work. If your partner/spouse is currently not working, please describe their occupational history. Provide a job title and brief description of the work.

_____
_____
_____

20. Approximately how many hours does your partner/spouse work outside of the home each week? _____

21. Your child participating in this study lives in your household:

___ 100% of the time
___ 75-99% of the time
___ 51-74% of the time
___ 50% of the time
___ 25-49% of the time
___ 1-24% of the time

22. What is your child's grade level in school? _____

23. Please select one of the following options to describe your child's typical performance in school.

___ My child usually receives all A's (3.7 to 4.0)
___ My child usually receives A's and B's (2.7 to 4.0)
___ My child usually receives all B's (2.7 to 3.3)
___ My child usually receives B's and C's (1.7 to 3.3)
___ My child usually receives all C's (1.7 to 2.3)
___ My child usually receives C's and D's (1.0 to 2.3)
___ My child is failing many courses (0.0 to 1.3)
___ My child's school does not assign letter grades or GPAs

24. What activities is your child involved in (i.e., sports, leadership roles, arts, etc.)?
_____
_____
_____

25. Please indicate which of the following diabetes related events have occurred with your participating child in the past 6 months. If you mark yes, please indicate the number of times these events have occurred.

	Has this event occurred in the past 6 months?		If yes, please indicate the number of times these events have occurred
	Yes	No	(DK = don't know)
Your child has been to the emergency room because of his/her diabetes?			
Your child had a low blood sugar reaction?			
Your child had to use a glucagon kit to treat a low blood sugar event?			
Your child has been hospitalized because of his or her diabetes?			
Your child missed school because of his/her diabetes?			
You missed work because of your child's diabetes?			

26. Does your child have health insurance that covers diabetes expenses?
___ Yes
___ No

27. How is this insurance provided?
___ Parent employment
___ Medicaid
___ Privately paid insurance
___ Other (please specify) _____

28. Are there different diabetes treatments (insulin pump, etc) that your child would be likely to use if the treatment was covered by your insurance or if you had insurance? If you marked yes, please name specific treatments.
___ Yes (please specify) _____
___ No

29. In the past 6 months, approximately how much "out of pocket" money (i.e., expenses not covered by insurance) have you spent on your child's diabetes? If you have spent no "out of pocket money" put "0" in the box.

_____

30. What is the approximate number of insulin injections per day recommended by your child's physician? If you don't know, please enter "DK" and if your child is on an insulin pump please write "pump".

_____

31. What is the approximate number of glucose tests per day recommended by your child's physician? If you don't know, please enter "DK".

_____

32. What methods does your child use to record blood sugars (check all that apply)?

___ Written log book
___ Computer spreadsheet
___ Downloaded glucose readings
___ Meter memory function
___ Other method (please specify) _____
___ My child does not record blood sugars

33. Does your child use a continuous blood glucose monitor (CGMS)? If yes, please indicate how long they have been using a CGMS (in years).

___ Yes (specify length of use in years) _____
___ No

34. Which of the following methods does your child use to administer insulin (check all that apply)?

___ My child uses injection
___ Insulin pen
___ Inhaled insulin
___ External insulin pump (if yes, specify length of use in years) _____
___ Implantable insulin pump (if yes, specify length of use in years) _____
___ Other method (please specify) _____

35. Please describe your child's current insulin regimen. List the insulin type and then check what time of day each type of insulin is administered (check all that apply). If your child uses a pump then check the In-pump (continuous) option.

	List Insulin Type	When is this insulin type administered?					
		In-pump	Morning	Noon	Bedtime	Meals	High Blood Sugar
Insulin 1							
Insulin 2							
Insulin 3							

36. Who attended your child's most recent clinic visit with him/her (check all that apply)?
___ You
___ Your child's father/your partner
___ Your child's grandmother
___ Your child's grandfather
___ Your child's sibling(s)
___ Other (please specify) _____

37. What was your child's Hba1c at his/her last clinic visit (specific numerical value)?
_____

38. What would you have liked your child's Hba1c to have been (specific numerical value)? _____

39. We are interested in your family diabetes history. Please indicate if any of the following people have been diagnosed with Type 1 or Type 2 diabetes.

	Type 1 Diabetes	Type 2 Diabetes	No	Don't Know
You				
Your child's biological father				
Your child's maternal grandparents				
Your child's paternal grandparents				
Other adults living in your household				

40. How is your health in general?
       ___ Poor
       ___ Sometimes poor
       ___ Sometimes good
       ___ Fair
       ___ Good
       ___ Very good

41. What is your height? _____

42. What is your weight (in pounds)? _____

43. Which of the following statements best describes your current diet?
___ I'm on a strict diet, I watch everything I eat, and consider myself a healthy eater
___ I try to adhere to a diet and eat foods that are suggested but my lifestyle makes it difficult
___ I don't adhere to a specific diet but I try to choose healthy food when I can
___ I eat pretty much what I want and don't worry about diet or nutrition

44. On how many of the last **SEVEN DAYS** did you participate in at least 30 minutes of physical activity (total minutes of continuous activity, including walking.)?

                 0   1   2   3   4   5   6   7

45. Have you smoked a cigarette in the last 6 months?

    ____ Yes
    ____ No. If no, skip to question 47

46. On how many days of the last 30 days did you smoke one or more cigarettes?

    ____ None
    ____ 1-5 days
    ____ 6-10 days
    ____ 11-20 days
    ____ 21-29 days
    ____ 30-31 days (every day)

47. Have you consumed alcohol in the last 6 months?

    ____ Yes
    ____ No. If no, skip to question 49

48. On how many days of the last 30 days did you drink alcohol?
   ____ None
   ____ 1-5 days
   ____ 6-10 days
   ____ 11-20 days
   ____ 21-29 days
   ____ 30-31 days (every day)

49. Have you ever been diagnosed with depression by a health care professional?
___ Yes
___ No. If no, skip to question 51

50. Are you currently taking medications for your depression?

51. Please check all that apply to describe yourself, your participating child, and your partner/spouse (if applicable):

	You	Your child	Partner/spouse
Indigenous American Native (North America, Mexico, Central America, and South America)			
Asian			
Native Hawaiian or Pacific Islander			
Black or African American			
White			
Other (specify) _____			

52. I would consider the following people to be Hispanic/Latino:

	Yes	No
Myself		
My participating child		
My partner/spouse		

53. In what country were you born (for example, America, Mexico, Spain)?
_____

54. In what country were your parents born?
_____

APPENDIX B

Center for Epidemiological Study Depression Scale -CES-D

Instructions: Please read the following items and circle the number that **best describes how often you thought** or **felt** that way during the **past week**.

0 = Rarely or None of the Time (less than 1 day)
1 = Some or a Little of the Time (1-2 days)
2 = Occasionally or a Little of the Time (3-4 days)
3 = Most or All of the Time (5-7 days)

	None/Rarely	Some/Little	Occasionally	Most/All
1. I was bothered by things that don't usually bother me.	0	1	2	3
2. I did not feel like eating; my appetite was poor.	0	1	2	3
3. I felt that I could not shake off the blues even with help from family or friends.	0	1	2	3
4. I felt that I was just as good as other people.	0	1	2	3
5. I had trouble keeping my mind on what I was doing.	0	1	2	3
6. I felt depressed.	0	1	2	3
7. I felt that everything I did was an effort.	0	1	2	3
8. I felt hopeful about the future.	0	1	2	3
9. I thought my life had been a failure.	0	1	2	3
10. I felt fearful.	0	1	2	3
11. My sleep was restless.	0	1	2	3
12. I was happy.	0	1	2	3
13. I talked less than usual.	0	1	2	3
14. I felt lonely.	0	1	2	3

15. People were unfriendly.	0	1	2	3
16. I enjoyed life.	0	1	2	3
17. I had crying spells.	0	1	2	3
18. I felt sad.	0	1	2	3
19. I felt that people dislike me.	0	1	2	3
20. I could not get "going."	0	1	2	3

Self Care Inventory-SCI

Instructions: Please rate each of the items according to **how well
you followed your recommended regimen for diabetes care
in the past month**.
Use the following scale:

1 = Never did it
2 = Sometimes followed recommendations; mostly not
3 = Followed recommendations about 50% of the time
4 = Usually did this as recommended; occasional lapses
5 = Always did this as recommended without fail
NA = Not applicable to my regimen

In the **past month**, how well have you followed recommendations for:	Never	Sometimes	50%	Usually	Always	NA
1. Checking blood glucose with monitor?	1	2	3	4	5	NA
2. Glucose recording?	1	2	3	4	5	NA
3. Checking ketones in blood or urine when blood glucose level is high?	1	2	3	4	5	NA
4. Administering correct insulin dose?	1	2	3	4	5	NA
5. Administering insulin at right time?	1	2	3	4	5	NA
6. Adjusting insulin intake based on blood glucose values?	1	2	3	4	5	NA
7. Eating the proper foods or counting all carbohydrates eaten?	1	2	3	4	5	NA
8. Eating meals/snacks on time?	1	2	3	4	5	NA

9. Carrying quick-acting sugar to treat reactions?	1	2	3	4	5	NA
10. Coming in for appointments?	1	2	3	4	5	NA
11. Wearing a medic alert ID?	1	2	3	4	5	NA
12. Exercising regularly?	1	2	3	4	5	NA
13. Reading food labels?	1	2	3	4	5	NA
14. Treating low blood glucose?	1	2	3	4	5	NA
15. Counting carbohydrates correctly?	1	2	3	4	5	NA
16. Calculating insulin doses based on carbohydrate content of meals or snacks?	1	2	3	4	5	NA

Children's Depression Inventory -CDI

Kids sometimes have different feelings and ideas.

This form lists the feelings and ideas in groups. From each group of three sentences, pick one sentence that describes you *best* for the past two weeks. After you pick a sentence from the first group, go on to the next group.

There is no right answer or wrong answer. Just pick the sentence that best describes the way you have been recently. Put a mark like this ✖ next to your answer. Put the mark in the box next to the sentence that you pick.

Here is an example of how this form works.   If you read books a lot, you would probably check the first sentence, like this.

Example:

✖	I read books all the time.
☐	I read books once in a while.
☐	I never read books.

Remember, in each box, pick out the one sentence that describes you best in the PAST TWO WEEKS.

Item 1
- ☐ I am sad once in a while.
- ☐ I am sad many times.
- ☐ I am sad all the time

Item 2
- ☐ Nothing will ever work out for me.
- ☐ I am not sure if things will work out for me.
- ☐ Things will work out for me O.K.

Item 3
- ☐ I do most things O.K.
- ☐ I do many things wrong.
- ☐ I do everything wrong.

Item 4
- ☐ I have fun in many things.
- ☐ I have fun in some things.
- ☐ Nothing is fun at all.

Item 5
- ☐ I am bad all the time.
- ☐ I am bad many times.
- ☐ I am bad once in a while.

Item 6
- ☐ I think about bad things happening to me once in a while.
- ☐ I worry that bad things will happen to me.
- ☐ I am sure that terrible things will happen to me.

Item 7
- ☐ I hate myself.
- ☐ I do not like myself.
- ☐ I like myself.

Item 8
- ☐ All bad things are my fault.
- ☐ Many bad things are my fault.
- ☐ Bad things are not usually my fault.

Item 9
- ☐ I do not think about killing myself.
- ☐ I think about killing myself but I would not do it.
- ☐ I want to kill myself.

Item 10
- ☐ I feel like crying every day.
- ☐ I feel like crying many days.
- ☐ I feel like crying once in a while.

Item 11
- ☐ Things bother me all the time.
- ☐ Things bother me many times.
- ☐ Things bother me once in a while.

Item 12
- ☐ I like being with people.
- ☐ I do not like being with people many times.
- ☐ I do not want to be with people at all.

Item 13
- ☐ I cannot make up my mind about things.
- ☐ It is hard to make up my mind about things.
- ☐ I make up my mind about things easily.

Item 14
- ☐ I look O.K.
- ☐ There are some bad things about my looks.
- ☐ I look ugly.

Item 15
- ☐ I have to push myself all the time to do my schoolwork.
- ☐ I have to push myself many times to do schoolwork.
- ☐ Doing schoolwork is not a big problem.

Item 16
- ☐ I have trouble sleeping every night.
- ☐ I have trouble sleeping many nights.
- ☐ I sleep pretty well.

Item 17
- ☐ I am tired once in a while.
- ☐ I am tired many days.
- ☐ I am tired all the time.

Item 18
- ☐ Most days I do not feel like eating.
- ☐ Many days I do not feel like eating.
- ☐ I eat pretty well.

Item 19
- ☐ I do not worry about aches and pains.
- ☐ I worry about aches and pains many times.
- ☐ I worry about aches and pains all the time.

Item 20
- ☐ I do not feel alone.
- ☐ I feel alone many times.
- ☐ I feel alone all the time.

Item 21
- ☐ I never have fun at school.
- ☐ I have fun at school only once in a while.
- ☐ I have fun at school many times.

Item 22
- ☐ I have plenty of friends.
- ☐ I have some friends but I wish I had more.
- ☐ I do not have any friends.

Item 23
- ☐ My schoolwork is alright
- ☐ My schoolwork is not as good as before.
- ☐ I do very badly in subjects I used to be good in.

Item 24
- ☐ I can never be as good as other kids.
- ☐ I can be as good as other kids if I want to.
- ☐ I am just as good as other kids.

Item 25
- ☐ Nobody really loves me.
- ☐ I am not sure if anybody loves me.
- ☐ I am sure that somebody loves me.

Item 26
- ☐ I usually do what I am told.
- ☐ I do not do what I am told most times.
- ☐ I never do what I am told.

Item 27
- ☐ I get along with people.
- ☐ I get into fights many times.
- ☐ I get into fights all the time.

Figure 1

*Maternal report of household income by ethnicity*

Maternal report of household income

■ Latino Families ■ Caucasian Families

Income	Latino Families	Caucasian Families
Less than $5K	11	3
$5K - $9.9K	5	0
$10K - $14.9K	3	2
$15K - $24.9K	9	5
$25K - $49.9K	15	5
$50K - $74.9K	8	17
$75K- $100K	3	10
> 100K	1	19
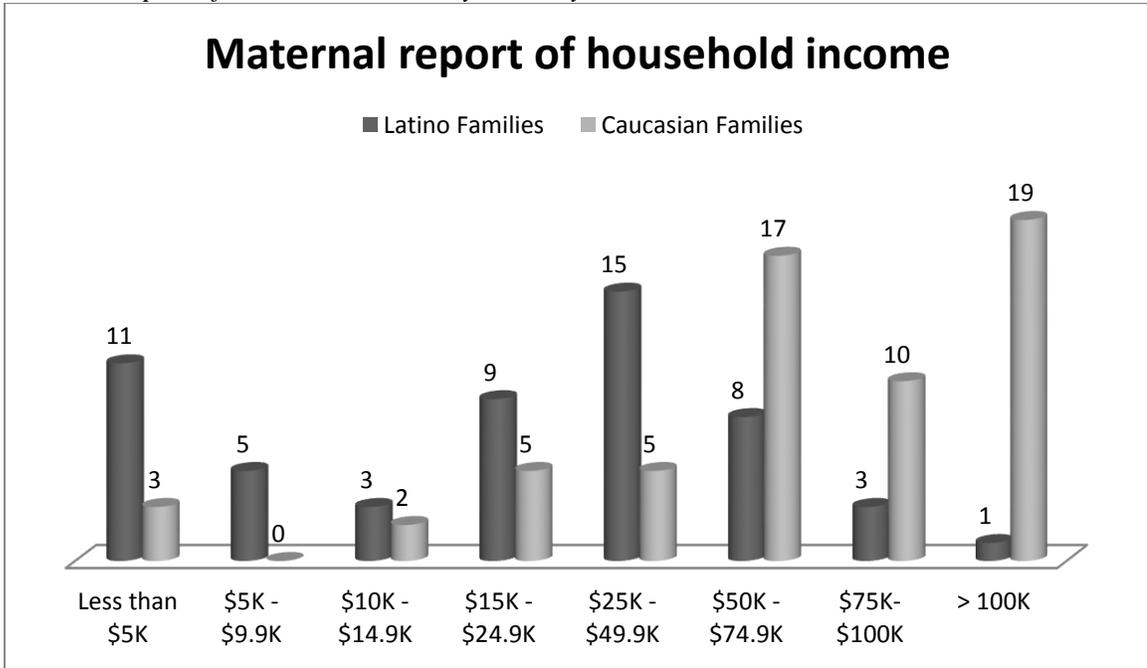
Figure 2

Maternal report of her level of education by ethnicity

■ Latina Mother ■ Caucasian Mother

Education	Latina Mother	Caucasian Mother
Did not graduate high school	15	0
High school Graduate or GED	22	10
Partial College	12	22
College degree and beyond	6	29
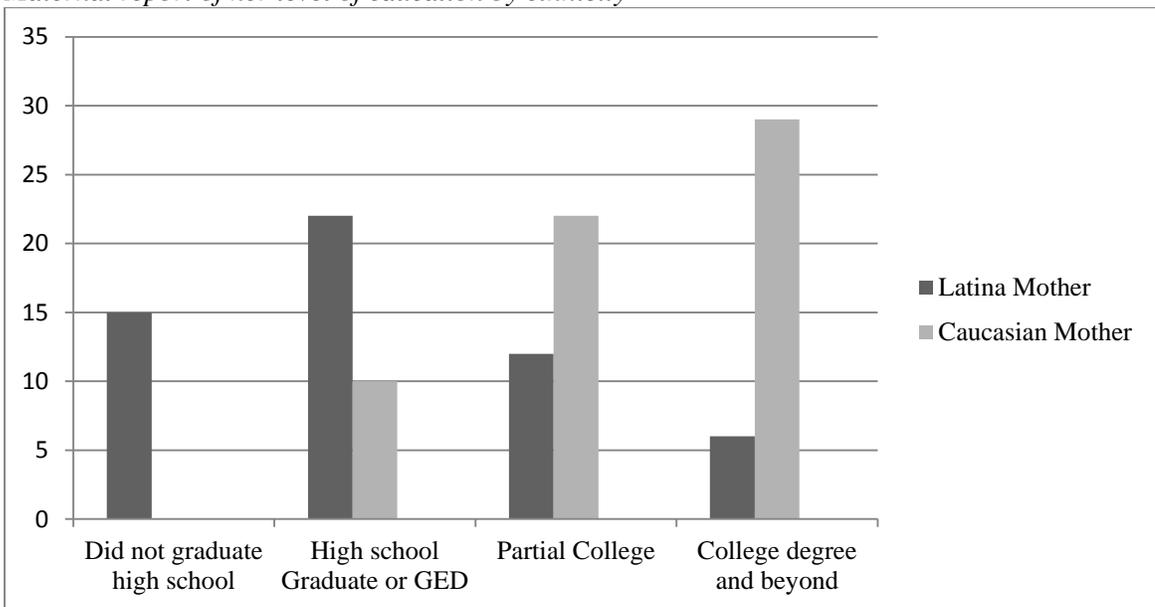
Figure 3

Predicted Means for Maternal Depressive Symptoms X Ethnicity X Age Predicting Adolescent Depressive Symptoms
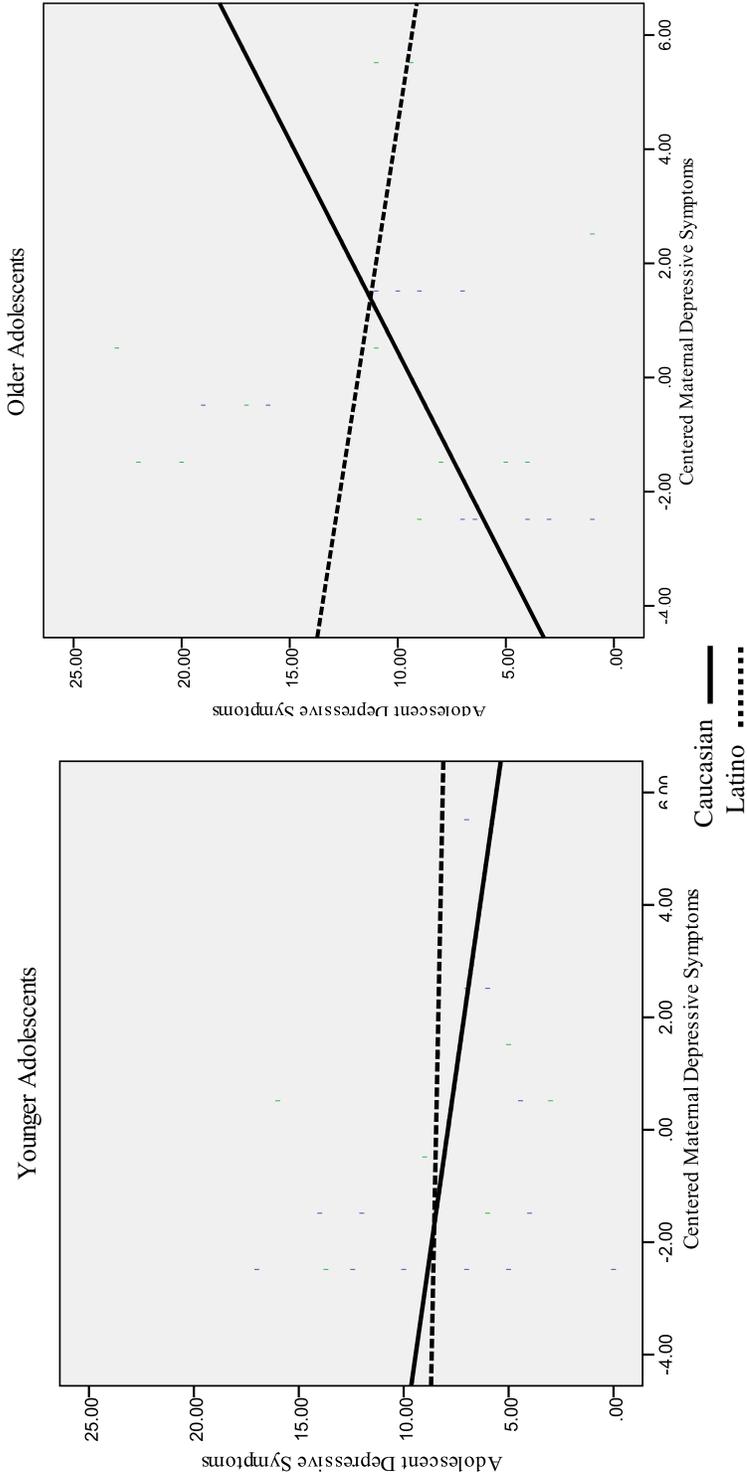
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