

EFFECTS OF CHILDHOOD CHRONIC ILLNESS ON DEPRESSION OUTCOMES IN  
ADULTHOOD

by

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The present study evaluated the impacts of a chronic illness diagnosis in childhood on long-term depression levels in adulthood. Additionally, this study sought to determine whether the age at which a diagnosis was received and the parenting styles of the caregivers of the patient influenced these outcomes. Participants were 8,984 adults from a cohort of the National Longitudinal Survey of Youth that began in 1997. Results suggest that there are not significant differences in the levels of depression of adults with and without a chronic illness. Findings also suggest that the age at which a participant with a chronic illness was diagnosed does not have a significant influence on their long-term depressive symptoms. Additionally, these results suggest that the presence of either an authoritarian or an uninvolved parenting style in maternal caregivers and an authoritarian parenting style in paternal caregivers significantly increase depression outcomes. Understanding these influences is essential for providing the best quality of well-rounded care for pediatric patients to ensure long-term positive outcomes.

*Keywords:* chronic illness, depression, parenting styles, biopsychosocial model, family systems theory



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ADULTHOOD

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by

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## CHAPTER 1: INTRODUCTION

This thesis sought to look at the relationship between childhood chronic illness and adult mental health, in particular, depression levels. Additionally, it sought to examine how the parenting styles of caregivers of children with chronic illnesses may impact depression outcomes in adulthood. This chapter provided necessary background information regarding chronic illness, depression, and parenting styles that guided this research. This chapter also highlighted the theoretical frameworks by which the results of this study were examined.

For the last several decades, the health and development of children has been heavily studied from a number of perspectives. One issue that has garnered particular focus is that of chronic illness and the impacts it has on other developmental areas. A physical illness is considered to be chronic if health problems impact normal activities, lead to limitations or dependencies, and when these limitations occur for a minimum of three months (Secinti et al., 2017). Roughly 25% of children and adolescents aged 0-18 years in the United States are affected by a chronic health condition; 5% of these children are diagnosed with multiple illnesses (Delamater et al., 2017). Some of the most common chronic illnesses experienced by American children are obesity, asthma, cancer, and diabetes, to name a few (Delamater et al., 2017). The presence of chronic health conditions can have significant impacts on all aspects of a child's development as well as their daily functioning and quality of life. In addition to this developmental impact, chronic physical illnesses often require medical treatment that can be extremely costly to families. The annual cost of medical treatments for five common chronic illnesses – asthma, hypertension, food allergies, diabetes, and epilepsy – for children ages 0-18 ranges from \$487.42 to \$25,039.41 depending upon treatment types and insurance levels (Miller

et al., 2016). These costs can put significant strain on families, leading to more life stressors and potentially inadequate treatment adherence.

One notable developmental area that chronic health conditions can have an influence on is that of mental health. Mental health encompasses several aspects of a person's life, including psychological, emotional, and social well-being and can be impacted by both biological and environmental factors ("What is Mental Health?", 2022). When compared to members of the general population, those with long-term physical conditions are two to three times more likely to develop common mental health disorders such as depression and anxiety (Delameter et al., 2017). Additionally, at least one in five children and adolescents between the ages of 9 and 17 in the general population has a diagnosable mental health disorder that causes impairment to daily functioning; one in ten has a mental illness that creates severe impairment. The most common mental illnesses in this age group fall in to one of four categories: anxiety, mood, attention, and behavioral disorders (ACOG Committee, 2017). Among the negative implications that these disorders may have on the lives of children and adolescents is a potential for a greater negative perception of one's chronic physical illness. Mental health can be defined in a wide variety of ways, including through the presence or absence of a diagnosed disorder, the severity of symptoms of a disorder, or through general quality of life ratings. One's mental health can impact how they think, feel, and act ("What is Mental Health?", 2022). Despite the importance of seeking care in the presence of symptoms of a mental health disorder, many people do not seek treatment for a number of reasons. These may include feelings of guilt or shame, a lack of understanding of the implications of symptoms, or a deficit of access to resources. Historically, the rates of referral to mental health services have been low, especially for children and adolescents with chronic illnesses. Even when referrals are made, on average, just over half of

those referred actually see a mental health professional (Delamater et al., 2017). When left untreated in childhood or adolescence, mental health conditions can persist into adulthood. The comorbidity of mental and physical conditions can ultimately contribute to poorer overall health outcomes and higher costs of care. Research has highlighted several barriers to treating the comorbidity of physical and mental conditions, such that depressive symptoms are often considered to be a normal response to disease diagnosis, which in turn lessens mental health management (Coventry et al., 2011). It is important for healthcare professionals to recognize these relationships in order to provide effective care for their patients. These relationships have generated an area of research dedicated to discerning the bidirectional influence of these conditions on the health of children and adolescents and how these outcomes can be combatted.

Another significant factor that can influence the physical and mental development of children and adolescents with chronic illness is that of the parenting style of their caregivers. Parenting styles were first defined by Diana Baumrind in the 1960s, with expansions on these ideas added by Nancy Darling and Laurence Steinberg in the 1990s. These styles are generally described in one of four ways: authoritative, authoritarian, permissive, or uninvolved (Darling & Steinberg, 1993). Of these four parenting styles, the most positive is considered to be authoritative. Caregivers with this style are generally able to find a balance between nurturing their children in a supportive manner and setting firm rules that are explained to children in developmentally appropriate ways (Baumrind, 1966). Children of authoritative parents generally have better mental health, have higher self-esteem, and are more independent (Li, 2022). In relation to parenting children with chronic illnesses, an authoritative parenting style is associated with more positive health outcomes and better parent-child relationships (Manne et al., 1993). Permissive parents are defined as those with high levels of warmth, but failure to enforce limits

or monitor children (Baumrind, 1966). This style can be detrimental to illness outcomes, as parents may be less likely to enforce treatment adherence. Similarly, uninvolved parents are not responsive to their children's needs, including medical treatments and appointments (American Psychological Association, 2017; Manne et al., 1993). Finally, authoritarian parents are those who are highly demanding with low levels of warmth and responsiveness to their children (Dewar, 2018).

### **Purpose of This Study**

The purpose of this study was to examine the long-term relationship between chronic illness in childhood and mental health outcomes in adulthood. This examination sought to determine whether those who received a chronic illness diagnosis in childhood were at a higher risk for depression in adulthood than those who do not have a long-term illness. This investigation also attempted to discern if there are differences in these risk levels based on the age at which a person was diagnosed with a chronic illness. Additionally, it sought to identify whether the parenting style of caregivers of chronically ill children had an impact on the mental health outcomes of those patients.

### **Theoretical Framework**

#### ***Biopsychosocial Model***

This study was guided by two theoretical models: the biopsychosocial model and family systems theory. The biopsychosocial model is a theoretical framework that claims that medical outcomes are a result of biological, psychological, and social factors working in tandem with one another (Engel, 1977). This theory has worked to challenge the historically reductionistic biomedical model that views illnesses solely through the identification of measurable biological

variables. This model instead emphasizes the subjective nature of patient experiences and recognizes the importance of a multidimensional approach to patient care (Engel, 1977). Given the complexity of the relationship between biological, social, and psychological factors, each is important to consider when generating treatment plans (Borrell-Carrio et al., 2004). Additionally, it is necessary to recognize that each of these variables have an influence on every aspect of illness development, from onset to long-term outcomes (Engel, 1977). With this understanding, it is reasonable to assume that there would be a relationship between a patient's physical and mental development.

For the purposes of this study, the biopsychosocial model was used to look at the association between childhood chronic illnesses and adult mental health outcomes and the role of parenting styles in moderating this association. In keeping in line with this framework, it is believed that each of these factors work together to influence patient outcomes. Mental health outcomes can be viewed as a result of the interplay between a child's physical diagnosis and their environment, as examined through their caregivers' parenting styles. Additionally, biological factors such as race and gender and social factors such as maternal age at first birth and maternal level of education were examined to further the understanding of potential associations between physical illness and mental health.

### ***Family Systems Theory***

In order to further examine the relationship between parenting styles and mental health outcomes of adults with a chronic illness, this study also used the family systems theory. The family systems theory posits that families are unique constellations of intersecting personalities, with patterns of relationships that can be categorized as either highly integrated or unintegrated. Each family has a distinct manner of interaction, with varying levels of ritual, interdependence,

and shared objectives (Burgess, 1926). This theory views family processes from the perspective that changes seen within any member of the family, including the child, can generate changes for all family members (Bengston et al., 2004). This viewpoint is applicable to the present study in that the physical changes associated with chronic illness in childhood can influence the child's interactions with their caregivers; at the same time, the parenting style exhibited by caregivers can impact the manner in which children experience their illness and treatment.



## **CHAPTER 2: LITERATURE REVIEW**

This chapter reviewed the findings of recent relevant literature on the relationship between chronic illness and mental health as well as the role that parenting style has in this relationship. It also attempted to identify any potential gaps in the literature that may require further future research. The onset of a chronic illness in childhood can impact not only physical development but also long-term mental health development. In the last decade, research on the long-term mental impacts of these stressors has greatly increased. Special attention has been paid to mood disorders, such as depression and anxiety. Additionally, some studies have suggested that the parenting style of those with chronically ill children can have a moderating, or buffering, impact on child outcomes.

### **Psychological Distress in Pediatric Hospitalization**

Hospitalization can be a highly stressful experience for children and can impact them beyond the immediate treatment that they receive. Research on the developmental impacts that hospitalization has on children dates back to the early 1960s. One meta-analysis conducted in 1965 highlighted the results of over 200 articles that identified psychological upset that followed hospital discharge, including behavioral changes, increased separation and sleep anxieties, and more aggressive behavior, especially toward authority (Vernon et al., 1965). The significant stress caused by hospitalization can cause post-traumatic stress-like symptoms, especially for those who experienced high intensities of pain or who did not have a parent or caregiver present (Ben-Ari et al., 2021). For young children ages one to six, psychological distress has been found to be present three to five months following hospitalization for surgery, with just over 10% exhibiting posttraumatic stress symptoms (Ben-Ari et al., 2017). This effect is even more significant in children who experience repeated hospitalizations (Ben-Ari et al., 2020). In some

cases, the challenges that children experience throughout the hospitalization process may extend not only beyond discharge, but also into adolescence. Hospitalization of young children has been linked to adjustment difficulties in adolescence, especially for those who were hospitalized for longer than one week at a time or who had multiple admissions before the age of five years (Douglas, 1975). Given that negative outcomes such as behavioral changes and adjustment issues have been seen to persist after hospital discharge, in some cases through at least adolescence, families of children with chronic illnesses are likely to experience long-term challenges. These challenges can be linked to the potential for greater persistent psychological distress in both parents and children. These effects have been found to be lessened, however, through greater parent participation in care during hospitalization (Jones et al., 2017).

### **Pediatric Chronic Illness and Adult Depression Outcomes**

Chronic illness has long been seen to lead to psychological distress, particularly during hospitalization; however, this distress has the potential to endure beyond hospital discharge and lead to long-term mental health diagnoses (Vernon et al., 1965; Douglas, 1975). Psychological distress that has extended beyond the hospital has been linked to psychosocial problems in children, including emotional and behavioral issues (Hogan et al., 2011). Children with chronic illnesses are also at a greater risk of developing a mood disorder, such as unipolar and bipolar depression (Chen et al., 2014).

The presence of mental health disorder symptomology has been studied heavily among adult survivors of childhood cancer. In general, cancer survivors appear to have a disproportionately large risk of psychological distress, including higher rates of depression than healthy counterparts (Michel et al., 2010). One research review of 34 studies found a significant association between eight childhood onset chronic illnesses and adult depression levels, with

cancer in particular standing out as having a highly significant relationship with depression (Secinitti et al., 2017). When looking more closely at this relationship, some differences have been identified based on the types of long-term effects that cancer survivors have developed due to the style of treatment they received. In particular, endocrine and pulmonary conditions have a significant association with depression in adulthood (Vuotto et al., 2016). Additionally, when adult survivors of childhood cancer perceive worsening physical health over their lifetime following diagnosis, they also experience increased distress symptoms over time (Brinkman et al., 2013).

Despite the prevalent belief that childhood cancer survivors are at a greater risk than the general population for psychological difficulties, recent research has shown that that is not always the case. In many cases, adult survivors of childhood cancer do not significantly differ from healthy siblings of survivors on depression or depression correlates, such as perception of health (Teta et al., 1986; Gianinazzi et al., 2013). There is a potential, however, that comparison with siblings of childhood cancer survivors may not portray an accurate depiction of the differences between cancer survivors and the general population, as siblings are often still affected by the cancer diagnosis (Barrera et al., 2018). There has been other evidence to indicate that adult cancer survivors may not always be at a higher risk for mood disorders. Some cases point toward lower depression levels for adult survivors of childhood cancer twenty years after treatment cessation compared to counterparts who have always been healthy (Harila et al., 2011). Although it is somewhat unclear whether adult cancer survivors are at a higher risk for psychological distress, there has been evidence that when distress is present, its impacts are more significant than distress in the general population (Gianinazzi et al., 2013).

The conflicting results seen in mental health outcomes of adult survivors of childhood cancer are emulated in studies of other chronic illnesses as well. Studies of epilepsy have found that young adults with the illness are not significantly more depressed than siblings of epilepsy patients; however, they are more anxious than peers with asthma or allergies (Baldin et al., 2015; Mullins et al., 2016). Additionally, patients with heart disease who undergo the Fontan procedure have been seen to have greater levels of depression than healthy peers (Pike et al., 2012). The inconsistent results surrounding the comorbidity of mood disorders and chronic illness appear to be influenced by a number of factors. One such factor is the age of the patient when examined for psychological distress. Adolescents with asthma and food allergies have higher rates of depression and anxiety, respectively, however, these differences diminish in young adulthood (Ferro et al., 2015). Between adolescence and early adulthood, young men with diabetes show an increase in sleep disturbances over time (Palladino et al., 2013). Another factor that influences psychological outcomes in chronically ill patients is the prognosis of the illness. Illness uncertainties and the intrusiveness of treatment both significantly impact psychological functioning, regardless of illness diagnosis (Mullins et al., 2016).

Despite the significant number of research studies that have highlighted the negative long-term mental health effects of chronic illness, several studies have also indicated the possibility for positive growth in chronically ill patients. For example, young adults with type 1 diabetes report higher levels of depression and anxiety than healthy peers; however, they also show higher appreciation of life, greater levels of personal strength, and higher recognition of new possibilities (Kremer et al., 2016). One potential moderator that has been suggested for these positive outcomes is that of positive parent-child relationships. Adolescents with cystic fibrosis show favorable psychosocial functioning when they have close parent-child relationships

and effective communication with parents, even when parents themselves have depressive symptoms (Tluczek et al., 2014).

### **Parenting Styles and Chronic Illness**

Regardless of the specific diagnosis, a chronic illness in a child can have substantial influences on the entire family (Barrera et al., 2018). As such, family processes like parenting style are impacted, which in turn can affect illness outcomes through factors such as treatment adherence. Increased levels of parenting stress led to lower parental responsiveness, less family resilience, and lower quality of life outcomes for children (Im et al., 2019; Qiu et al., 2021; Pinquart, 2013). These potential negative outcomes can be moderated, however, by the maintenance of positive parenting practices. It has been found that children with caregivers who engage in an authoritative parenting style are more likely to exhibit positive health-related behaviors, including washing their hands and eating healthy (Park & Walton-Moss, 2012). Parents of chronically ill children who have a more supportive parenting style are less likely to cancel or delay appointments for their children and are more likely to show up to these appointments on time. These practices help to ensure that children are receiving the treatment that they need in a timely manner, which has a positive impact on health outcomes (Manne et al., 1993). When looking at adolescents with chronic pain, it was found that an authoritarian parenting style with high levels of overprotectiveness was linked with higher risk of pain. Conversely, adolescents with caregivers who exhibit an authoritative parenting style have lower risks of physical chronic pain (Shaygan & Karami, 2020). The presence of parenting behaviors that are considered to be negative, such as inconsistency or overinvolvement, have a significant impact on chronically ill adolescents' self-concept and may lessen their ability to adjust to their illness (Ahn & Lee, 2016). These findings indicate the importance of the parent-child

relationship in supporting positive healthy outcomes and buffering the potential for negative ones.

## **Current Study**

Given that such a large number of children ages 0-18 are diagnosed with a chronic illness, with roughly 25% of this population affected, it is important to evaluate the impacts that these illnesses have on psychosocial well-being in order to develop the best practices for treatment. Additionally, with more chronically ill children surviving into adulthood, it is necessary to understand the influences that illness has on both physical and mental development and how to adjust treatments throughout the lifespan. The current state of the literature suggests that chronic illness may impact psychosocial development such that children with chronic illnesses have a potential for a higher risk of negative long-term mental health outcomes. Additionally, there is evidence to suggest that positive parenting style may have a moderating influence on these outcomes. There are, however, gaps in the literature, particularly as it pertains to the relationship between the age at which a person is diagnosed with a chronic illness and their long-term mental health. The purpose of this study was to gain further insight into the relationship between childhood chronic illness and adult mental health outcomes, as well as the role of caregiver parenting styles in this relationship. This study also intended to fill gaps that may have been present in the literature. In support of these purposes, three hypotheses were developed, which are as follows:

H1: It was expected that there would be a positive relationship between pediatric chronic illness and adult mental health outcomes, such that participants who have a chronic illness would have higher levels of depression than healthy counterparts.

H2: It was expected that there would be a negative relationship between the age at which a chronic illness was diagnosed and adult mental health outcomes, such that participants who were diagnosed with a chronic illness at a later age would have lower levels of depression than those diagnosed at a younger age.

H3: It was expected that the parenting style of childhood caregivers would influence adult mental health outcomes, such that the presence of an authoritative parenting style during childhood chronic illness treatment would lead to lower levels of depression in adulthood.

## **CHAPTER 3: METHODS**

This chapter outlined the procedure that was followed for data collection and analysis. This thesis utilized secondary data that was collected as part of an ongoing program of longitudinal studies conducted by the U.S. Department of Labor Statistics (2021). This data was analyzed using independent-samples t-tests and OLS regressions through RStudio and Stata software programs.

### **Procedure for Data Collection**

This study utilized data from the National Longitudinal Survey of Youth 1997 (NLSY97), which is part of the National Longitudinal Surveys (NLS) program. This dataset was suitable for use in the current study because it has followed participants from early adolescence to early adulthood, up to age 38 years old. Participants completed annual surveys for fourteen years beginning in 1997, and biannual surveys from 2013 on, with a total of 19 rounds of interviews currently available to the public. Among a wide variety of topics, the NLS program provides insight into childhood health information, such as presence and type of chronic condition, age of diagnosis, and the severity of impact on daily functioning. Information about childhood health was provided by the participants as well as by their parents at the time for the first round of interviews. Additionally, this data provides information on mental health in adulthood, including diagnosis of a mental health condition, the frequency that mental health problems have impacted daily activities, and whether or not participants sought treatment by a mental health professional. The goal of this study is to understand the relationship between childhood chronic illness diagnosis and adult mental health outcomes - specifically, depression levels - as well as the role that caregiver parenting style plays into that relationship.



## **Participants**

The NLSY97 cohort is comprised of two subsamples of data. The first was a cross-sectional sample consisting of 6,748 respondents designed to be representative of people born between 1980 and 1984 living in the United States at the time of the initial survey round. The second, supplemental, sample was designed to oversample Hispanic or Latino and Black people living in the United States during the initial survey round who were born during the same period as the cross-sectional sample; this subsample consisted of 2,236 respondents. The current study utilized the combined participants from these subsamples. At the time of the first survey of the NLSY in 1997, there were 8,984 participants interviewed along with their parents. At the time of this study, 19 rounds of interviews have been conducted by the NLS program. Nearly 77% (n=6,734) of participants who were surveyed in round 1 were interviewed in the most recent survey, at which point participants were between the ages of 32 and 38 years old.

Information gathered through the NLSY97 included domains of employment, education, household, geography, and contextual variables, parents, family process, and childhood, dating, marriage, and cohabitation, sexual activity, pregnancy and fertility, children, income, assets, and program participation, health conditions and practices, attitudes, expectations, non-cognitive tests, activities, crime, and substance use. For the purposes of this study, data from the health conditions and practices section were examined.

## **Measures**

*Physical Health.* During the first round of surveys, parents were asked an extensive series of questions about their child's health, including identifying whether their child had any known chronic conditions. The presence of a chronic illness was measured through a yes or no question.

If parents indicated that their child had a chronic illness, they were directed to a follow up question where they identified what condition their child had been diagnosed with. This question provided multiple choices and asked parents to select every chronic illness that their child had been diagnosed with. The choices were asthma, heart condition, anemia, diabetes, cancer, epilepsy, infectious disease, kidney disease, allergies, and other. Parents were also asked to fill in a blank indicating what age the condition was first noticed. Answers were then coded for each age entered, with anything over 17 years old being coded as 18+. For the purposes of this study, *chronic illness* and *age at diagnosis* were both defined using parent reports from the first survey round.

*Mental Health.* At the time of round 19, participants were given a shortened version of the Center for Epidemiologic Studies Depression Scale (CES-D), that contained 7 items. This scale was developed in 1977 by Lenore Radloff and has become a widely used scale in psychiatric epidemiology (Radloff, 1977; Murphy, 2002). Participants were asked to rate statements regarding the frequency of certain feelings in the week prior to the interview, with possible answers ranging from “not at all” to “almost every day”. These statements included “I did not feel like eating” and “I felt that everything I did was an effort” (The Center for Innovative Public Health Research, n.d.). Ratings were then converted to numerical values, with “not at all” being coded as 1 and “almost every day” being coded as 3. The shortened version used in the NLSY surveys had a possible range of 0 to 21, with higher scores indicating higher depressive symptomology. The questions used in the shortened scale can be found in Appendix A. For the purposes of this study, *mental health* was examined using scores from the CES-D scale.

*Parenting Style.* During rounds 1 through 4, youth respondents were asked about the *parenting styles* of both their residential mothers and fathers. In order to determine parenting style, youth were asked to rate their residential parents individually on their levels of supportiveness as well as whether they were strict or permissive. Answers to these questions were then combined in order to be coded as a single parenting style variable, which were categorized as uninvolved, permissive, authoritative, and authoritarian. For the purposes of this study, the researcher-created parenting style variables for both residential mothers and residential fathers from the first round conducted in 1997 were used.

*Covariates.* During the initial survey, participants were asked several demographic questions, including their *gender* and *race and/or ethnicity*. Youth participants were asked to select either male or female for their gender. Race and ethnicity of youth participants were defined using one combined variable and were categorized as Non-Black/Non-Hispanic, Black Non-Hispanic, Hispanic or Latino, and Mixed Race (Non-Hispanic). Additionally, during the initial survey, parents of participants were asked to report on demographic information including *maternal education* and *maternal age at first childbirth*. Maternal education referred to the highest grade of education completed by the youth participant's biological mother and had possible answers ranging from none to eight or more years of college. Mothers of participants were also asked to report on their age at the time of their first childbirth, with possible answers ranging from 0 to 50 and over. Each of these covariates was used in this study in order to gain a clearer picture of the variables that influence the relationship between childhood chronic illness and adult depression levels.

### **Procedure for Data Analysis**

This study utilized previously collected data from the National Longitudinal Survey of Youth (NLSY), focusing specifically on the cohort of participants that began in 1997. The current study utilized data from both the first and the 19<sup>th</sup> round of interviews. In order to examine this data, the desired variables were downloaded from the NLSY's online data investigator. Data was imported into version 4.0.3 of R Studio as well as version 16.1 of Stata for analysis (The R Foundation, 2020; StataCorp, 2019). Data collected from these surveys was analyzed using independent-samples t-tests and linear models. An independent-samples t-test was used to compare the mean CES-D scores of participants who had a chronic illness to the mean scores of those who did not. OLS regressions were then used in order to understand the relationships between predictors, such as race and maternal education level, and depression outcomes.

## CHAPTER 4: RESULTS

This chapter discussed the results found in this study. It examined whether there was a statistically significant relationship between the presence of a chronic illness in childhood and depression levels in adulthood. It also sought to examine any potential relationship between the age at which a chronic illness was diagnosed and depressive symptomology in adulthood. Finally, this chapter reports the results of caregiver parenting styles on the depression levels of adults who were diagnosed with a chronic illness in childhood.

### Demographics

In the NLSY97 youth cohort, there were 4,599 (51%) males and 4,385 (49%) females interviewed in the initial survey. Of these participants, 51.9% (n=4,665) were Non-Black/Non-Hispanic, 26% (n=2,335) were Black Non-Hispanic, 21.2% (n=1,901) were Hispanic or Latino, and 0.9% (n=83) were Mixed Race (Non-Hispanic). Nearly 11% of caregivers of participants reported that their child had been diagnosed with a chronic illness during their childhood or adolescence. Demographics for participants are showcased in Table 1.

**Table 1**

***Participant Demographics***

---

	n	%
Gender		
Male	4599	51
Female	4386	49
Race/Ethnicity		
Black	2335	26
Hispanic	1901	21.2

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Non-Black/Non-Hispanic	4665	51.9
Mixed Race (Non-Hispanic)	83	0.9
Presence of chronic illness		
Illness present	865	10.96
No illness present	7024	89
Maternal Age at 1 <sup>st</sup> Birth		
<15	107	1.3
15 to 19	2179	26.4
20 to 24	3309	40
25 to 29	1890	22.9
30 to 34	633	7.7
35 to 39	132	1.6
40+	17	0.13
Maternal Education Level		
< High School	694	8.3
9 <sup>th</sup> Grade	273	3.3
10 <sup>th</sup> Grade	428	5.1
11 <sup>th</sup> Grade	562	6.8
12 <sup>th</sup> Grade	3038	36.6
1 <sup>st</sup> Year College	642	7.7
2 <sup>nd</sup> Year College	1002	12
3 <sup>rd</sup> Year College	248	2.9
4 <sup>th</sup> Year College	908	10.9
5 <sup>th</sup> Year College or More	495	5.9
Maternal Parenting Style		
Authoritative	3626	42.3
Permissive	2999	34.9
Authoritarian	1065	12.4

Uninvolved	890	10.4
Paternal Parenting Style		
Authoritative	2511	39.1
Permissive	1832	28.5
Authoritarian	1261	19.6
Uninvolved	817	12.7

---

### **Presence of Chronic Illness**

This study hypothesized that there would be positive relationship between pediatric chronic illness and adult depression levels, as seen by higher depression scores for those with a chronic illness as compared to healthy counterparts. An independent-samples t-test was utilized to first compare the CES-D scores of survey participants who have a chronic illness to those who do not. This was done in order to get a general idea of whether or not chronic illness alone has a significant impact on long-term mental health. There was no significant effect of having a chronic illness,  $t(6070) = -1.795, p = .073$ , with participants with a chronic illness showing slightly higher CES-D scores ( $M = 3.26, SD = 3.83$ ) than those without a chronic illness ( $M = 2.97, SD = 3.86$ ). These findings do not support the first hypothesis, which posited that those with a chronic illness would have greater levels of depressive symptoms than their healthy counterparts.

Following the t-test, linear models were completed in order to generate a clearer understanding of the impact of individual variables on depression outcomes. The first OLS regression conducted looked at the impact of covariates on the CES-D scores of those with and without a chronic illness. Overall, the regression was statistically significant ( $r^2 = 0.012, F(5, 5460) = 14.06, p < .000$ ), indicating that there is a relationship between CES-D scores and the

variables examined. When considering all variables, it was found that the presence of a chronic illness, participant gender, and the age at which the participant’s mother gave birth to her first child significantly impacted depression scores. The presence of a chronic illness significantly increased depression scores ( $\beta = .365, p = .025$ ), while maternal age at first birth ( $\beta = -.026, p = .018$ ) and participant gender ( $\beta = -.767, p < .000$ ) both significantly reduced depression scores. Additionally, when examining outcomes of participants of different races and/or ethnicities, it was found that Hispanic individuals had significantly lower depression levels when compared to Black individuals ( $\beta = -.556, p = .000$ ). This finding supports the first hypothesis, which estimated that participants with chronic illnesses would increase depressive symptoms when compared to healthy counterparts. The full output of covariate impacts on CES-D scores can be seen in Table 2.

**Table 2**  
*Impact of Presence of Chronic Illness on Depressive Symptoms*

	Estimate	Std. Error	<i>p</i> -value
Intercept	3.536	.292	.000
Presence of chronic illness	.365	.163	.025
Gender	.767	.102	.000
Maternal age at 1 <sup>st</sup> birth	-.026	.011	.018
Race (Reference: Black)			
Hispanic	-.556	.156	.000
Mixed Race (Non-Hispanic)	.406	.591	.492
Non-Black/Non-Hispanic	-.145	.126	.249
Maternal education level	-.018	.015	.233



## Age at Illness Diagnosis

The second hypothesis of this study predicted that there would be a negative relationship between the age at which a chronic illness was diagnosed and adult depression levels, such that those who were diagnosed later in life would have lower levels of depression than those who were diagnosed at a younger age. The impact of participant age at chronic illness diagnosis was examined using an OLS regression that utilized each of the covariates. The mean age of diagnosis was 13.77 years old (SD = 6.614). The overall regression was not found to be statistically significant ( $r^2 = 0.103$ ,  $F(5, 106) = 2.019$ ,  $p = .069$ ). When looking at participant age at diagnosis, it appeared that a chronic illness diagnosis later in life led to higher depression scores (Figure 1), however, this relationship was not found to be statistically significant ( $\beta = .066$ ,  $p = .415$ ). Participant's mother's age at first birth did, however, did have a statistically significant influence at reducing depression levels ( $\beta = -.198$ ,  $p = .029$ ). This finding does not support Hypothesis 2, which stated that participants who were diagnosed with a chronic illness later in adolescence would have lower levels of depression than those diagnosed earlier in life.

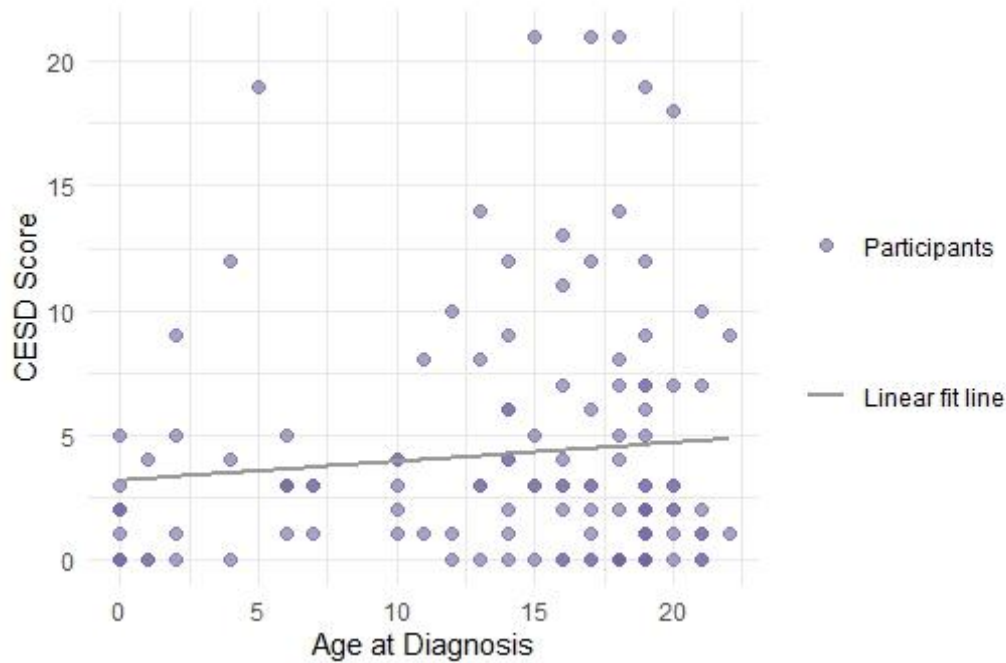
**Table 3**

*Impact of Age at Diagnosis on Depressive Symptoms*

	Estimate	Std. Error	<i>p</i> -value
Intercept	2.696	3.291	.415
Age at diagnosis	.066	.080	.405
Gender	.958	1.033	.356
Maternal age at 1 <sup>st</sup> birth	-.198	.089	.029
Race (Reference: Black)			
Hispanic	-.067	1.74	.969
Mixed Race (Non-Hispanic)	--	--	--
Non-Black/Non-Hispanic	1.51	1.35	.269

**Figure 1**

*Relationship Between Age at Diagnosis and Depressive Symptoms of Adults with Chronic Illness*



**Maternal Parenting Styles**

The final hypothesis of this study posited that the parenting style of residential childhood caregivers would have an impact on the depression levels of adults who were diagnosed with a chronic illness in childhood. Namely, it was believed that an authoritative parenting style would lead to lower levels of depression for those with a chronic illness when compared to participants whose caregivers showed any other parenting style. A final analysis was conducted in order to identify any potential relationship between parenting styles, childhood chronic illness, and adult depression levels. When looking at maternal parenting styles, the overall regression was found to be statistically significant ( $r^2 = 0.019$ ,  $F(10, 5315) = 10.06$ ,  $p < .000$ ). It was found that, when compared to outcomes of participants whose mothers had an authoritative parenting style, the

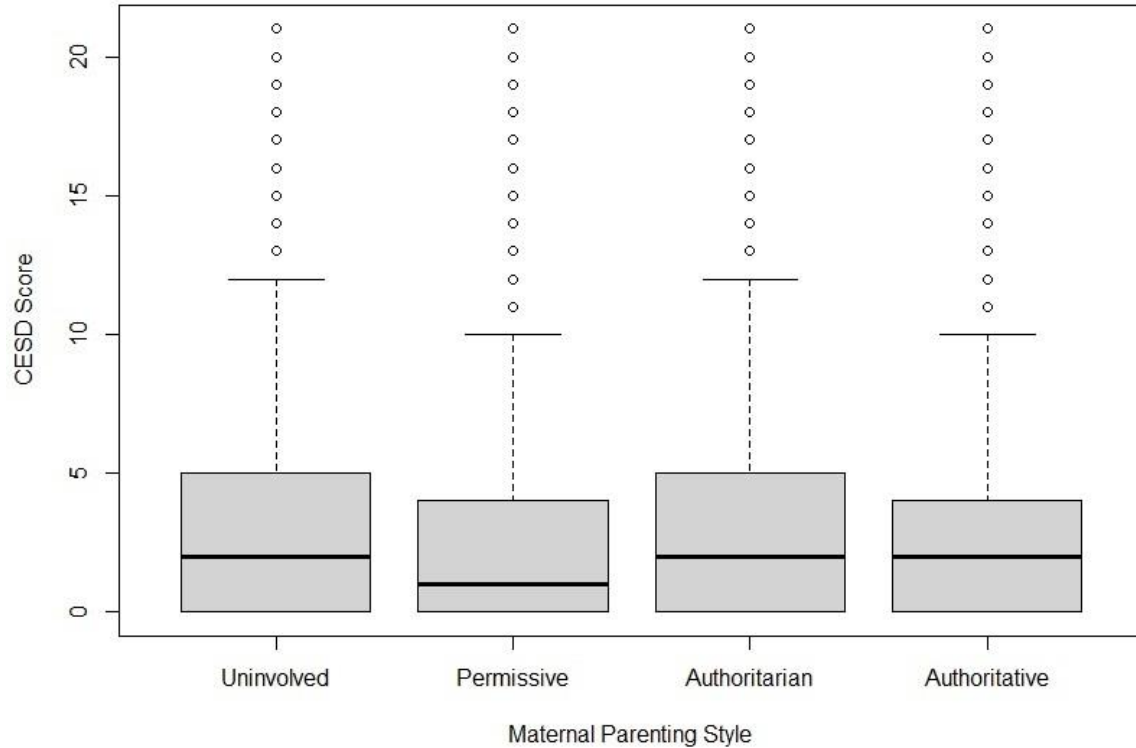
presence of both uninvolved and authoritarian parenting styles significantly increased depressive symptoms ( $\beta = .558, p = .002$  and  $\beta = .572, p = .001$ , respectively). Additionally, while not statistically significant, a maternal permissive parenting style was seen to slightly reduce depression levels of participants (Figure 2). The presence of a chronic illness did have a significant impact on increasing depression outcomes when taking parenting style into consideration ( $\beta = .352, p = .031$ ). It was also found that participant gender played a significant role in increasing depression scores ( $\beta = .706, p < 0.00$ ), while maternal age at first birth significantly reduced depression scores ( $\beta = -.024, p = .033$ ). When comparing the outcomes of participants based on their race and/or ethnicity, it was found that Hispanic participants had significantly lower CES-D scores than all other participants ( $\beta = -.529, p = .001$ ).

**Table 4**

*Impact of Maternal Parenting Style on Depressive Symptoms of Those with a Chronic Illness*

	Estimate	Std. Error	p-value
Intercept	2.669	.354	.000
Presence of chronic illness	.352	.164	.031
Gender	.706	.103	.000
Maternal age at 1 <sup>st</sup> birth	-.024	.011	.033
Race (Reference: Black)			
Hispanic	-.529	.156	.001
Mixed Race (Non-Hispanic)	.355	.621	.568
Non-Black/Non-Hispanic	-.161	.126	.203
Maternal education level	-.014	.015	.325
Maternal parenting style (Reference: Authoritative)			
Uninvolved	.558	.178	.002
Permissive	-.033	.117	.777
Authoritarian	.572	.167	.001

**Figure 2** Impact of Maternal Parenting Style on CESD Scores



### Paternal Parenting Styles

When taking into consideration paternal parenting styles, it was found that the overall regression was statistically significant ( $r^2 = 0.019$ ,  $F(10, 3900) = 7.87$ ,  $p < .000$ ). When looking more closely, it was found that the presence of an authoritarian parenting style significantly increased depressive symptoms when compared to the outcomes of participants whose fathers had an authoritative parenting style ( $\beta = .832$ ,  $p = .000$ ). Additionally, the gender of the participant ( $\beta = .598$ ,  $p < .000$ ) and the age of the participant's mother at the time of her first birth ( $\beta = -.032$ ,  $p = .016$ ) both had significant impacts on depression levels, with maternal age at first birth reducing depression levels, while participant gender contributed to increases. As with maternal parenting style, a permissive paternal parenting style did reduce depression levels,

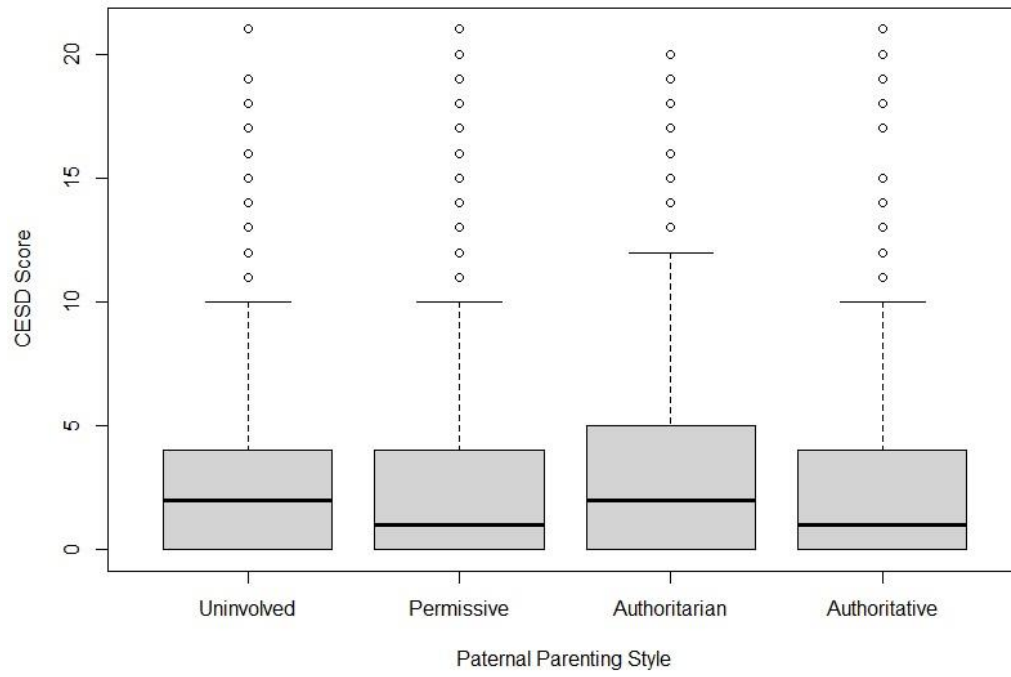
although not to a statistically significant level (Figure 3). Findings for both maternal and paternal parenting styles supported the third hypothesis, which stated that the presence of an authoritative parenting style would reduce depressive symptoms.

**Table 5**

*Impact of Paternal Parenting Style on Depressive Symptoms of Those with a Chronic Illness*

	Estimate	Std. Error	<i>p</i> -value
Intercept	2.566	.411	.000
Presence of chronic illness	.234	.194	.226
Gender	.598	.118	.000
Maternal age at 1 <sup>st</sup> birth	-.032	.013	.016
Race (Reference: Black)			
Hispanic	-.303	.194	.119
Mixed Race (Non-Hispanic)	.357	.675	.597
Non-Black/Non-Hispanic	-.014	.159	.932
Maternal education level	-.010	.016	.512
Paternal parenting style (Reference: Authoritative)			
Uninvolved	.176	.189	.352
Permissive	-.144	.146	.322
Authoritarian	.832	.163	.000

**Figure 3** Impact of Paternal Parenting Style on CESD Scores



## CHAPTER 5: DISCUSSION

This chapter discussed the implications of the results found in this study. These implications were utilized to encourage positive steps that can be taken by healthcare professionals to better support the populations that they serve. Additionally, this chapter highlighted limitations that were present in this study as well as how these limitations can make way for future research.

This study examined the depressive symptoms among adults who were diagnosed with a chronic physical illness during childhood. The results found in this study point to several conclusions. First, it can be believed that there is a connection between chronic illness in childhood and resulting mental health in adulthood. Specifically, the presence of a chronic illness that was diagnosed in childhood was linked to depression levels in adulthood which was slightly higher than that of healthy counterparts. Although these levels alone were not statistically significant, the trend toward significance indicates the possibility that chronic illness may impact mental health in some capacity. Factors such as race and ethnicity, gender, and maternal age at first birth appear to have varying degrees of influence over this relationship. Hispanic individuals, in particular, had the lowest depressive symptoms. Looking at these results through the lens of the biopsychosocial model, it is unsurprising to find that both biological factors such as gender and environmental factors such as the age at which a participant's mother gave birth to her first child appeared to influence mental health outcomes (Borrell-Carrio et al., 2004). These findings highlight the importance of personalized care and encourage growth in areas such as cultural competence within the healthcare field. Professionals working with children and their families must recognize the influence of all factors on family dynamics, cultural views of illness, and treatment compliance in order to provide the most effective care. Knowing that factors such

as maternal age at first birth can contribute to patient outcomes should encourage healthcare professionals to seek to understand patients and their families on a deeper level in order to provide them with adequate resources that may be beneficial to their care. Additionally, these findings point to the need for healthcare professionals to be better prepared to discuss mental health, particularly when working with children with a chronic illness. It is also vitally important for these professionals to be able to refer patients to the appropriate mental health services in order to reduce depression outcomes in the future. In this way, the findings of this study point toward the need for a biopsychosocial model of care that includes collaboration from both medical and mental health professionals and that addresses all aspects of a person's subjective patient experience.

This study also found that there is not a significant relationship between the age at which an individual is diagnosed with a chronic illness and their long-term depression outcomes. There did, however, appear to be a non-significant increase in depressive symptoms for adults who were diagnosed with a chronic illness later in life than those who were diagnosed in early childhood. This increase may, in part, be explained by the fact that adults who were diagnosed with a chronic illness earlier in life have had more time to cope with their illness (Ferro et al., 2016). When considering these results with the family systems theory in mind, it is also possible that, given the impact that a chronic illness diagnosis has on an entire family, it is also easier for family members to make adjustments together that support the individual with the illness (Bengston et al., 2004). This may in part be explained by the family systems theory's concept of integrated versus unintegrated families, in which highly integrated families hold unified goals that lessen the importance of individual purpose (Burgess, 1926).



Finally, this study found that the parenting style of caregivers has a relationship with depression outcomes for adults who were diagnosed with a chronic illness in childhood. When considering the parenting style of both mothers and fathers, it was found that an authoritarian parenting style significantly increased depression levels compared to an authoritative parenting style (Manne et al., 1993). This is likely due to the highly demanding nature of the authoritarian parenting style, coupled with the fact that authoritarian parents typically show less warmth to their children (Dewar, 2018). This may have made it difficult for children to feel as though they had a caring support system throughout their chronic illness treatment, leading to higher depression levels later in life. It was also found that an uninvolved maternal parenting style significantly increased levels of depression; however, the same was not true when looking at paternal parenting style. These differences may partly be explained due to expectations of gender roles within family systems, where mothers may be expected to be more involved than fathers, making it more impactful when they are not (Perry-Jenkins et al., 2013).

### **Limitations**

There were several limitations that became apparent while conducting this study. The first of these was that the use of secondary data limited the variables that could be examined, as well as what data was available for those variables. For example, this study examined depression levels among individuals with chronic illnesses, however, there was no separation of diagnoses. It is possible that the mental health outcomes of chronic illness patients could vary across diagnoses. The use of secondary data also assumes that surveys were conducted in a manner that attempted to eliminate researcher bias as well as obtain an appropriate representative sample. While it is possible to access the questionnaires that were used, it is not possible to know what environment the questionnaires were conducted in or if it influenced participants in any way.

Additionally, as the NLSY is an ongoing study, it is possible that new rounds of data will be released which may generate new findings that differ from those found within this research. Finally, given the unique constellation of identities held by individuals and their families, it is difficult to ascertain exactly which factors have the strongest impact on outcomes such as mental health. Although general conclusions can be drawn based on the data that has been collected, it is important to recognize that every patient with a chronic illness will have a unique experience and that direct causal relationships cannot be assumed.

Despite the limitations of this research, it still holds value for helping to understand the impact that chronic illness can have on a person's life beyond the expected physical outcomes. This study supports previous research that indicates that chronic illness can be linked to both physical and mental health problems (Vernon et al., 1965; Douglas, 1975; Chen et al., 2014; Seciniti et al., 2017). Understanding the implications of these links can lead to better awareness of potential symptoms as well as better treatment options. It is important for professionals working with those with chronic illnesses to recognize all of the factors that may be contributing to patient outcomes, including aspects such as familial backgrounds. Given that these factors combine in unique ways for every patient, professionals working with those with chronic illnesses should take all of these aspects into account when creating treatment plans, as suggested by the biopsychosocial theory (Engel, 1977). If this is done, it is possible that negative outcomes can be lessened through the implementation of beneficial buffers, such as individualized coping strategies. Future research would benefit from examining other mental health conditions, such as anxiety, as well as other potential factors that can influence the relationship between physical and mental illness. Additionally, given that this study found that the age at which a woman gives birth to her first child can impact the relationship between the physical and mental well-being of

her children, future research should seek to identify the maternal age for which this relationship is the strongest. Finally, future research should also seek to further examine the potential for varied mental health outcomes across differing chronic illnesses.

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## APPENDIX A: CESD SCALE SCORING

R19 CESD SCORE (7 ITEM)

Center for Epidemiologic Studies Depression(CESD) Scale Scoring for R19 NLSY97

The CES-D is a self-report scale that measures the current prevalence of depression symptoms. Respondents rate a series of statements regarding how they felt during the week prior to the interview.

1. I did not feel like eating. My appetite was poor. [YHEA-CESD-1A~000001]
2. I had trouble keeping my mind on what I was doing. [YHEA-CESD-1A~000002]
3. I felt depressed. [YHEA-CESD-1A~000003]
4. I felt that everything I did was an effort. [YHEA-CESD-1A~000004]
5. My sleep was restless. [YHEA-CESD-1A~000005]
6. I felt sad. [YHEA-CESD-1A~000006]
7. I could not get 'going'. [YHEA-CESD-1A~000007]

CESD 7-item scale score: Points are summed across the 7 items. The possible range of scores is 0 to 21. If one item is missing, the scale score is coded as missing.

2413	0			
2840	1 TO 4			
1105	5 TO 9			
347	10 TO 14			
159	15 TO 21			
-----				
6864				
Refusal (-1)	0			
Don't Know (-2)	0			
Invalid Skip (-3)	78			
TOTAL =====>	6942	VALID SKIP (-4)	5	NON-INTERVIEW (-5)
2037				
Min:	0	Max:	21	Mean:
3.01				