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LOMA LINDA UNIVERSITY
School of Science and Technology
in conjunction with the
Faculty of Graduate Studies

Childhood Depressive Symptoms: Comparison of Diverse Medical Diagnoses

by

Ida Babakhanyan

A Thesis submitted in partial satisfaction of
the requirements for the degree of
Master of Arts in Experimental Psychology

June 2011

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Each person whose signature appears below certifies that this thesis in his opinion is adequate, in scope and quality, as a thesis for the degree of Master of Arts.

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ACKNOWLEDGEMENTS

I would like to express my immense appreciation to the individuals who helped me complete this study. I would like to express my gratitude to Dr. Todd Burley for chairing my study and believing in me. Thank you for your wisdom, kindness, flexibility, and continued support. I am most grateful for having the opportunity to work with you and learn from you. I would also like to thank Drs. Zaytsev and Krishnamurthy for serving on my committee and for their advice and direction. My gratitude also goes out to Dr. Khoury for supervising me as a trainee, supporting my ideas, and helping me with collecting data on the incredible children we serve. Additionally, I would like to express my deepest gratitude to Dr. Kiti Freier whose passion for working in pediatrics helped me discover mine. Without you, none of this would have been possible. Thank you for being an inspiration, a mentor, and giving me the clinical opportunities to reach my goals.

To my friends, thank you for always being the breath of fresh air when I needed a break, wisdom when I needed advice, and encouragement when I needed to keep going. In particular, thank you to Sarah Ormseth, your friendship through this process is what helped me complete this study and have fun while doing so. I'm blessed to have met you on this journey and I continue to be amazed at how kind and intelligent a friend can be. Most of all, I would like to thank my family for their loving support as I pursue my education. Mom, Dad and Edgar, I love you more than I will ever be able to express and hope to be able to someday give to you even just a part of the loving support that you have shown to me. Mommy, thank you for being my foundation that brought me here, my rock that keeps me grounded, and my heart. It's because of you that I believe in myself enough to pursue my dreams.

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ABSTRACT OF THE THESIS

Childhood Depressive Symptoms: Comparison of Diverse Medical Diagnoses

By

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Master of Arts, Graduate Program in Psychology
Loma Linda University, June 2011
Dr. Todd Burley, Chairperson

Childhood depression is a serious problem and has long term implications including increased risk for suicide and comorbid conditions. In addition, depressed children are at greater risk for social difficulties, non-compliance to medical regime, and academic difficulties. Children undergoing a medical illness are at increased risk for developing depression, however, there have been few recent studies looking at emotional distress for this population. With thousands of children hospitalized every day, assessing for depressive symptoms is important in order to provide proper referrals and treatment recommendations following discharge. The purpose of the current study was to increase understanding of pediatric depression through analysis of the symptoms children report across various medical conditions.

This study included 54 children who were hospitalized for a medical condition at the Loma Linda Children's Hospital. The Children's Depression Inventory (CDI) was used to assess for depressive symptomatology. Contrary to what was expected, the hospitalized children report significantly fewer symptoms related to negative mood, ineffectiveness, negative self-esteem, and total score on the CDI compared with the normative sample. Age and length of hospitalization did not significantly predict depressive symptoms. Males reported greater level of depressive symptoms related to

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feeling ineffective compared with females. With regards to medical conditions, children with a chronic condition reported significantly greater number of depressive symptoms related to negative self- esteem compared with children in the non-chronic group. Those children who experienced a traumatic event, reported significantly less symptoms of depression related to negative mood, anhedonia, negative self-esteem, and total depression score compared to the non-trauma group. The exploratory phase of this analysis looked at depressive symptoms across various medical diagnoses, which included tumor, orthopedic injury, congenital conditions, neurological conditions, and "other" diagnoses which included patients hospitalized due to self inflicted injury. Results demonstrated that patients in the tumor group had significantly greater number of symptoms related to negative self-esteem then patients in the orthopedic injury group as well as the "other" group. Reasons for why children under stressful situations are not reporting depressive symptoms as anticipated should be explored in future studies.

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CHAPTER ONE

INTRODUCTION

Over the years, interest in the study of child psychopathology has increased dramatically. This has occurred due to a growing realization that childhood depression impacts children in a variety of ways, many childhood problems have lifelong consequences and costs both for children and for society, and most adult disorders are rooted in early childhood conditions and/or experiences (Mash & Wolfe, 2002). There is also better understanding of childhood disorders which offers promise for developing effective intervention and prevention programs.

History

Depression is one of the most common psychiatric disorders in children and adolescents, yet it was not recognized to exist in children for decades. Children were regarded as incapable of experiencing what was originally understood as an adult disorder. In 1812 Benjamin Rush, the first American psychiatrist, suggested that children were less likely to suffer from mental illness than adults because the immaturity of their developing brains would prevent them from retaining the mental events that caused insanity (Silk et al., 2000). In the 1960's there was little concern and understanding of childhood depression (Mash & Wolfe, 2008, Chapter 1). The myth that childhood is a happy and carefree time taints an adult's ability to understand the prevalence of depression in childhood. In fact, early psychiatrists had a difficult time accepting the fact that children can get depressed. Psychoanalytical literature stated that classical depressive disorder does not occur in children because of the absence of a well-

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internalized super-ego prior to adolescence (Rie, 1966). It was not very long ago that authors published their doubts whether or not depressive disorder existed in children. The mistaken belief that depression did not exist in children was rooted in traditional psychoanalytic theories. At the time, depression was viewed as hostility over loss that was turned inward. Hence, since children lacked sufficient superego development to permit aggression to be directed against themselves, it was believed that they were incapable of experiencing depression (Rochlin, 1959). Prior to the emergence of the modern views of mental illness in the early 19th century, much less attention was given to the study of psychopathology in children (Silk, Nath, Siegel, & Kendall, 2000). It is a misconception to view symptoms of depression as normal, passing expressions of certain developmental stages. Depression in young people is a recurrent problem; just at it is in adults.

As acceptance of depression grew in the 60's, the term "masked depression" (Glaser, 1967) and "depressive equivalents" (Toolan, 1962) were used. This concept suggested that the depressive affect was not directly expressed except for short periods of time with variety of behavioral problems reflecting alternate ways of expressing the depressive symptoms in children and adolescents (Poznanski, Cook, Carroll, & Corzo, 1983). Even in the 1960's as depression in children was barely understood, it was believed that masked depression could be the underlying cause of many behaviors including delinquency, school phobias, and learning difficulties. Depressive equivalents were used by Toolan (1962) to describe symptoms of eating and sleeping disturbances, boredom, restlessness, and psychosomatic symptoms. The exception to the trend in the 60's was with the work of Sadler and Jaffe (1965) from Hampstead Clinic who examined

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the psychoanalytic records of 100 children and described nine features which was found to be commonly associated with depressive affect. This constituted an important step towards the understanding of childhood depression because the authors were very clear in stating that depressive affect existed in children.

Starting the 1970's, concern for childhood depressive symptoms became an increasingly important area of investigation (Cytryn, McKnew, Levy, 1972; Kashani, Venzke, & Millar, 1981). In 1971, a meeting, which took place in Sweden, was the cornerstone in bringing attention to childhood depression. The theme of the Fourth Congress of the Union of European Pedopsychiatrists was on depressive state in childhood and adolescence. During this meeting, it was concluded that depressive states account for an important and relatively large share of mental disorders in children and adolescents (Annell, 1972). In 1975, the National Institute of Mental Health held a conference which attempted to confront the issue of childhood depression more objectively. In 1972 the GAP Committee on Child Psychiatry published a report and included for the first time a category of childhood depression under psychoneurotic disorders in a proposal for a diagnostic nomenclature suitable for children and adolescents. Childhood depression was finally recognized and it was possible to find it listed in at least one system of diagnostic nomenclature for children. Weinbert, Rutman, and Sullivan (1973) are known to be the first researchers to specify diagnostic criteria for childhood depression when they labeled a group of children as depressed or non-depressed. This classification later led to the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III) criteria in 1980 when it was published.

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Since its classification in the DSM-III, the understanding of childhood depression has been, for the most part, seen similarly to the identification of adult depression with similar symptomatology used for diagnosis (Nelson & Politano, 1990). The current diagnostic manual does not differentiate between childhood and adult depression. Until the recent decade in research, much of the field's knowledge about child psychopathology was from theory and research on adult disorders. For example, it was not until the 1990's that child focused models and research into such disorders as depression and anxiety emerged (Zahn-Waxler, Klimes-Dougan, & Slattery, 2000; Mash & Wolfe, 2008, Chapter 1).

Although following the 80's childhood depression was becoming more accepted, there remained controversy surrounding the topic and some professionals questioned its existence. It has been reported that during the 80's, pediatricians, having been trained with the medical model of illness, had less difficulty with acceptance that depression in children existed than psychiatrists (Poznanski et al., 1983). This dilemma has been compared with child abuse prior to the placement of all the reporting laws when it was missed for decades. Children who were labeled as having mental illness were stigmatized and distanced from when compared with children with physical illness (Martin, Pescosolido, Olafsdottir, & Mcleod, 2007). Research, which raised awareness on childhood mental illness, started informing clinicians about the relevance of children's mental health. In addition, federal laws were also established which encouraged support in the school setting for children who suffered from affective disorders (Palley & Kelly, 2003). Furthermore, suggestions for professionals who interact with children at school

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settings was made on how to interact, identify the problem, and provide support for those children who were exhibiting depressive symptoms during this era.

Mood Disorder

In the Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV), Major Depressive Disorder (MDD) is categorized under mood disorders. A diagnosis of MDD depends on the presence of a depressive episode plus the exclusion for other conditions such as psychotic disorder or the prior occurrence of a manic episode. If only one episode of Major Depression (MD) is identified then MDD is diagnosed as a single episode (American Psychiatric Association, 2000). If there are two or more episodes then the depressive disorder is identified as being recurrent. For the episodes to be identified as recurrent, the episodes must be separated by two months of time where criteria for MD episode are not met. Organic factors that may have caused or maintained the depression such as medication effects, head trauma, etc., must also be ruled out to diagnose MDD. To meet criteria for a major depressive disorder, the individual must experience five out of a list of nine symptoms during the same two-week period, where at least two of the symptoms must be depressed mood and loss of interest or pleasure. In addition, these symptoms must be a change from previous functioning.

Differentiating depression from normal grief is an important part of proper diagnosis. It is recommended that depression not be diagnosed within two months of a loved one's death. It is commonly understood by clinicians that depression should not be diagnosed if the symptoms are a normal part of the grieving process (Cournos, 2002). Weller, Weller, Fristad, and Bowes (1991) sought out to differentiate normally grieving

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children from those who are hospitalized with depression in order to identify important diagnostic indicators. It was found that although children who are grieving a loss report loss of interest, dysphoria, appetite and sleep disturbance, psychomotor retardation and agitation, guilt, and suicidal ideations; in general they report fewer symptoms than do those children who are hospitalized with depression (Weller et al., 1991). The largest difference between the groups was for symptoms of sleep disturbance, psychomotor retardation, fatigue, guilt/ worthlessness, and trouble concentrating; where depressed children endorsed more of these symptoms.

Dysthymia is another diagnosis that falls under mood disorders in the DSM-IV. Dysthymic Disorder is less severe then MDD and requires for symptoms to lasts longer than 1 year in children and adolescents. For the diagnosis of Dysthymia in children, the symptoms should include the presence of chronic disturbance in mood involving either depressed or irritable mood for most of the day, more days than not, and lasting for greater than one year, during which the individual is not symptoms free for anytime greater than 2 months (American Psychiatric Association, 2000). It has been found that an early onset of dysthymia, such as that in childhood, puts the individuals at risk for recurrent or chronic mood disorder (Mash & Barkley, 2002). For this reason, although the child may not be having a major depressive episode, those children who chronically display a low-grade depressed affect should be identified in order to provide them with the proper interventions.

Symptoms

Anhedonia has been reported to occur in approximately half of the children with depression (Mash & Wolfe, 2008; Stark, Rouse & Livingston, 1991). Anhedonia presents

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through complaints of boredom, resistance to take part in any activity, reluctance to leave the room or house, and lack of motivation (Voelker, 2003). In children, assessment for diminished pleasure can be done when attempting to engage a child in play, although it has been advised in research that this is not conclusive of anhedonia (Pataki & Carlson, 1990). A child's ability to engage in an activity should not exclude a diagnosis of depression; rather, anhedonia in children is often shown in a diminished pleasure with respect to everyday activity (Voelker, 2003). Often fatigue is present with anhedonia, which affects about 50-70% of children with depression. Children, who are experiencing what can be called as anhedonia fatigue may complain that any adult suggestion to engage in an activity or complete a task requires too much effort. Children can become resistant, withdraw, or have temper tantrums. Those children who suffer from depressive disorder tend to be especially less active in the daytime compared with children without depression or other psychiatric disorders. Lowered activity level observed by adults has been found to correlate with the ratings of the child's level of sadness, lack of interest in pleasure activities, and poor self-esteem (Smith, Martin-Herz, Womack, & Marsigan, 2003; Aronen, Teicher, Geenens & Curtin. 1996).

Another symptom most commonly associated with depression is depressed mood. This is defined by an emotional state as indicated by the individual such feeling sad or empty as well as symptoms observable by another person such as appearing tearful (American Psychological Association, 2000). A reference to this symptom in the Children's Depression Inventory is negative mood (Kovacs, 1992). Symptoms consist of vegetative states, which include weight loss or gain, sleep disturbance, and fatigue.

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Cognitive symptoms include feelings of worthlessness, guilt, difficulty concentrating, and suicidal ideations. Behavioral symptoms include psychomotor agitation and retardation.

It is important to distinguish between depression as a symptom, depression as a syndrome, and depression as a disorder (Cantwell, 1990; Solomon, 2001). Depressive symptoms are common across all ages, occurring in 15-40% of children and adolescents. Symptoms can be temporary and situational. As a syndrome, depression refers to a group of symptoms which occur together. The syndrome of depression can also occur with or be secondary to other disorders. As a disorder, depression involves depressive symptoms which have a minimum duration and are associated with significant impairments in functioning, defined by the DSM-IV diagnostic criteria for Major Depressive Disorder (MDD) and for Dysthymia (Mash & Wolfe, 2008, Chapter 8).

In Children and Adolescents

Depression affects children and adolescents in a number of areas of functioning including their mood, behaviors, changes in attitude, thinking, and physical condition (Mash & Wolfe, 2008, Chapter 8). Regarding mood, children with depression experience feelings of sadness that are much more exaggerated and more persistent than normal feelings of sadness. Other emotions which accompany the depressive mood are feelings of guilt, shame, and oversensitivity to criticism. In children, depression can be characterized by irritability in place of depressed mood as required for adult diagnosis. Children with depression can also be extremely argumentative, moody, and tearful, making it difficult for others to be around them. Anger, which has been show to increase

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risk of suicide, is a common symptom associated with the agitated states where agitation occurs in about 35% of children with depression (Ang & Huan, 2010).

Behaviors exhibited by children who are depressed can include increased restlessness and agitation, reduced activity, slowed speech, and even excessive crying (Mash & Wolfe, 2008, Chapter 8). Attitude change includes feelings of worthlessness and low self-esteem. Children can see themselves as inadequate and believe others also view them in that way. Mash and Wolfe (2008) explain that these children can also have excessive worries and fears which dominate their lives. Depressed children are more self-focused and feel extremely critical of themselves, appearing self-conscious. They can have a difficult time concentrating, remembering, and making decisions. Physically, children with depression can gain or lose weight due to changes in their appetite as well as appear tired. Children whose predominant symptom is agitation show higher levels of physical activity (Kronenberger & Meyer, 2001). Psychomotor agitation is manifested in extensive activity, which serves the purpose of providing a distraction from painful cognitions and affect.

It is also important to understand how depression manifests itself through the developmental sequence from infancy to adolescence. Depression can look different for children at various developmental stages (Birmaher, Ryan, Williamson & Brent, 1996; Shafii & Shafii, 1992). The ways in which children express and experience depression are related to their level of physical, emotional, and cognitive development. Behavioral and attachment symptoms are more common for children who are younger, whereas cognitive and emotional symptoms are more common for older age children. Psychopathological symptoms such as suicide attempts, psychosis, and adaptive

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functioning deficits are more common in adolescents with depression. In comparison to adolescents, somatic complaints, anxiety, phobia, and disruptive behaviors are more common in younger children with depression (Birmaher et al., 1996).

For infants and toddlers, depression is often characterized by behavioral flatness and attachment disruption whereas cognitive symptoms are not yet present. This may be due to the role of procedural memory (Burley, 2004). Cognitive symptoms associated with depression have already been ingrained in procedural memory, where the child already knows that their needs are not going to be met (Freier, 2008). Procedural memory, although not held in awareness, is available to guide behavior when situations arise that are similar to those situations previously encountered (Burley, 2004). For this reason, it is believed that infants are also able to get depressed, even though they don't have to cognitive capacity to rationalize much of what occurs around them. Simply by being present, memories and neuronal pathways are formed (Freier- Randal, 2008). Infant depression has been defined as being characterized by whining, withdrawal, weight loss, slowed or stunted growth, susceptibility to infection, dazed and immobile facial expression, intellectual decline, impaired social interaction, and withdrawal. In toddlers (age 1-2 years old) depressive symptoms consist of irritable mood, and delay in meeting developmental milestones of toddlerhood such as standing, walking, language development, and toilet training (Gotlib & Hammen 2009, Chapter 18). Additional symptoms include nightmares, self-stimulating behaviors such as rocking, head banging, and masturbation. Clinginess, oppositional behaviors, excessive fears, and decease in play have also been found in depressed toddlers (Shafii & Shafii, 1992). In addition, the study of infant depression has found elevated levels of cortisol in infants whose mother is

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depressed (Huot, Brebbab, Stowe, Plotsky & Walker, 2006). This has been suggested that due to the lack of contact with their mother, the infant is also able to get depressed.

Children in preschool years, age 3-5 year old, can also suffer from depression. For this age group symptoms can take the form of sadness, weight loss, motor retardation, suicidal ideation, tiredness, anger, apathy, illness, irritability and social withdrawal (Gotlib & Hammen 2009, Chapter 18). Due to these withdrawal symptoms, preschoolers who are depressed are observed to play less with other children. They also tend to verbally express their sadness, worthlessness, and fearfulness (Mash & Barkley, 2002).

Starting at age 6 years, depression in children shifts to resemble adult depression; consistent with the cognitive, mood, behavioral, and vegetative symptoms of this disorder (Kronenberger & Meyer, 2001). In school-aged children one of the first apparent symptoms of depression is a decline in performance. Performance is more clearly evaluated when a child is in school, as his or her performance can be compared with his or her peers. Thus, a decline in grades, failure to complete chores, and decline in activity performance such as sports can be an indication to caretakers of depression. When children present with problems such as failure to complete chores, they are likely to be classified as being bad or lazy than depressed (Kronenberger & Meyer, 2001).

In adolescence, volatile mood, intense self-consciousness, rage, low self-esteem, poor school performance, delinquent behaviors, substance abuse, sexual acting out behaviors and social withdrawal are common indicators of depression (Mash & Barkely, 2002; Shafii & Shafii, 1992). Some research has suggested that the biological dysregulation factor of depressive symptoms such as appetite or sleep irregularity does not appear until adolescence (Craighead, Smucker, Craighead, & Ilardi, 1998). After age

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13, depression in children tends to resemble that of depression in adults. Older children report depressive symptoms most consistent with DSM- IV symptoms of depression (Turgay, & Ansari, 2006). Several of the symptoms which occur in adults are also present in school age children with depression and are very common such as depressed mood and irritable mood (Saluja et. al., 2004).

Thus depressive symptoms vary depending on various age groups. Sadness, helplessness, loneliness, or unspecified feelings of being sad are found in 6-8 year olds. In 8-10 year olds experience feelings of negative self-esteem, feel helpless in ability to do things for themselves, and feel used by others. In 10-13 year olds, depression is characterized by suicidal thoughts (Mash & Wolfe, 2008, Chapter 8). Studies on age have shown that when comparing 7-10 year olds with 11-13 year olds, the younger age group scored higher on items such as "Nothing is fun at all" and "I am sure that terrible things will happen to me". Older children report higher on items such as "I do everything wrong" and "I hate myself" (Samm et. al., 2008). This indicates that older children have a stronger tendency to internalize their problems and report greater amount of self-blame. Another study found that older students score higher on the Children's Depression Inventory indicating greater level of depressive symptoms then younger students (Finch, Saylor & Edwards, 1985). It is a general consensus that the reported prevalence rates are an understatement of the problem, given that children don't respond well to obvious questions about sad mood (Oaklander, 1995).

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Demographic Factors

A long debated concept in this area of research is gender differences. One study, which looked at depression as measured by the Children's Depression Inventory (CDI), found that there were no differences in the overall depression score but there was a significant difference how symptoms were reported (Samm et al., 2008). Boys scored higher in items such as "I have to push myself all the time to do my schoolwork" and "I can never be as good as other kids", where girls scored higher on items such as "I feel like crying everyday", "I cannot make up my mind about things", and "most days I do no not feel like eating". Another study using the CDI to measure depression found that boys in general scored higher on the total depression score on the CDI when compared with girls in the 7-16 year old age groups (Finch, 1985). In general, females have a higher prevalence rate for overall depression (Saluja, 2004). With regards to age as a predictor of depression, studies have suggested that the risk for depression is greater in older children (Saluja et al., 2004). In fact, females starting at 15 years of age have been found to report the greatest level of depressive symptoms (Hawthorne, Goldney, & Taylor, 2008). It is difficult to determine from the limited data if children with medical illness are more likely to become depressed over time because of accumulated experiences with the illness or because of the known increase in the risk for depression with age (Burke, 1991).

Behavioral Manifestations of Depression

Understanding the symptoms associated with childhood depression is an important process for accurate diagnosis and differential diagnosis. Cognitive symptoms

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of depression, such as feelings of worthlessness, guilt, and difficulty concentrating are often difficult for children to express (Delgado & Schillerstrom, 2009). Behaviorally, feelings of worthlessness may be seen when a child expects to be criticized, ignored, or rejected by other children. How a child interprets their environment also reveals their underlying thought processes. Some research reports that those children with depression who have feelings of worthlessness or hopelessness will enter into situations where they expect to fail and eventually experience failure as a result of a self fulfilling prophecy (Delgado & Schillerstrom, 2009). Earlier studies which have looked into feelings of worthlessness and hopelessness have found that these characteristics are present in children with a lack of interest in self-care and appearance (Gotlib & Hammen 2009, Chapter 18). Self-care such as dressing and grooming can often appear to be lacking in these children. Feelings of guilt may emerge in defensive or anxious behaviors surrounding a negative situation. More recent studies looking at similar cognitive symptoms of depression have looked at structural brain abnormalities which can be associated with major depressive disorder and suggest that this may be the actual reason for the cognitive symptoms reported by this population (Delgado & Schillerstrom, 2009).

Depression is manifested in the child's academic environment. Depressed children often display diminished school performance (Pataki & Carlson, 1990). One of the many reasons for this includes difficulty a depressed child may have at paying attention in class. Some children are misdiagnosed with having attention problems for this reason. It is suggested that when the inattention is combined with sad mood, anxiety, low self-esteem, fatigue, irritability, and negative outlook; depression should be strongly considered as a diagnosis (Brunsvold, Oepen, Federman, & Akins, 2008). Although

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children with depression have equal the level of cognitive ability to non-depressed children, they perform poorly on standardized school testing (Calhoun, 2005; Kendall et al., 1990). Severe depression can impact a child's performance on cognitive testing due to symptoms such as psychomotor retardation in addition to difficulty remaining focused (Kronenberger & Meyer, 2001). Research has also shown that depressed children have slower processing speed (Calhoun, 2005) which is an important part of academic success.

These school problems can have a domino effect, where academic problems may bring out behavioral problems such as truancy. School underperformance is often seen by parents or teachers as the child being lazy, which impacts the adult-child relationship. For example, the child who gets in trouble at home for their poor academic performance is likely to gain a greater dislike for it. Behaviors associated with irritability and negative mood can be very frustrating for parents to deal with at home. In addition, discipline strategies can be a way of confirming for the depressed child of how negatively the world responds to him or her.

Depression also impacts a child's social environment (Mash & Wolfe, 2008, Chapter 8). A depressed child's peers are potentially less likely to be willing to sympathize and understand, causing increased isolation through a loss of friends and popularity. Research has shown that rejection and poor social competence are strong predictors of later depression (Cole, Martin, Powers, & Truglio, 1996). Three- fourths of children with depression can be socially withdrawn, irritable and engage in fighting behaviors with their peers, which leads to further isolation and rejection by their peer group (Stark et al., 1991). It has been reported that depressed children are rated less liked by their peers (Cicchetti, & Cohen, 2006, Chapter 12) and they interpret social

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relationship more negatively than children who are not depressed (Rudolph, Hammen, & Burge, 1997). Depressed children also have poorer socially related problem solving skills than their peers which make them more vulnerable to feeling social stress (Goodman, Gravitt, & Kaslow, 1995). Furthermore, research has shown that children with depression have fewer close friendships and feel more lonely and isolated, and as though others do not like them when compared to their non-depressed peers (Mash & Barkely, 2002). Although depressive symptoms can subside and children have the capacity to recover from depression the social impact may continue to impact them. It has also been suggested that when children recover from depression, they may continue to experience some social impairments (Kovacs & Goldston, 1991). It has been questions which problem comes first, depression or social difficulties. It is more widely accepted in literature that the depression creates increased social difficulties rather than social difficulties causing depression in children. An explanation for this is that depressed children who are withdrawn tend to have a difficult time maintaining social interactions (Mash & Wolfe, 2008).

Comorbid Conditions

Depression in children is often observed with other psychological diagnoses such as anxiety, oppositional defiant disorder, and conduct disorder. Children with comorbid conditions are likely to experience greater symptom severity and persistence, more negative correlates and sequelae, and a more intractable course than children without comorbid conditions (Drabick, Gadow, & Sprafkin, 2006).

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Attention Deficit Hyperactive Disorder

There are several diagnoses which co-occur with depression in children and adolescents. Children with Attention Deficit Hyperactive Disorder (ADHD) experience more depression than those without ADHD (Brunsvold & Oepen, 2008; Willcutt, Pennington, Chhabildas, Friedman, & Alexander, 1999). About 15% to 20% of children and adolescents with ADHD experience depression (Jensen et al., 1997). These children feel so helpless and overwhelmed that they are unable to deal with everyday life. In children with ADHD, depression also makes them more irritable, disrupts their sleep, appetite or ability to think. When depression and ADHD coexist, symptoms are more severe and cause for the need for tailored treatment (Turgay & Ansari 2006). Both the depression and the attention difficulties need to be addressed in treatment.

Anxiety

Anxiety is a common comorbid condition to depression, consequently it is difficult to differentiate between the depression and anxiety (Kronenberger & Meyer, 2001). In fact, the most frequent co-occurring disorder in clinic-referred children with major depressive disorder is anxiety disorders, particularly Generalized Anxiety Disorder (Mash & Wolfe, 2008; Simonoff et al., 1997). It has also been suggested by researchers that depression and anxiety become increasingly visible as separate but co-occurring disorders as the severity of the child's problems increase when the child gets older (Gurley, Cohen, Pine, & Brook, 1996). For example, children with depression can worry about various things which can include their self-esteem and disasters that can occur to others they care about. Prominent investigators in this area of research include the work

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of Birmaher et al. (1996) who has looked at the prognosis for this population. When depression and anxiety coexist and are comorbid, more negative outcomes are expected than if the child was diagnosed with depression alone (Birmaher et al., 1996). These negative outcomes include increased duration of the depressive symptoms, increased risk of suicidal behavior, and poorer response to psychotherapy.

Differentiating between depression and anxiety has been reported to be more difficult to do for younger children (Cole et al., 1996). Reason for this is that younger children express negative affect in way which can resemble symptoms of anxiety such as restlessness and irritability. It has been suggested that early childhood onset syndromes of depression or anxiety begin as an undifferentiated syndrome of negative affectivity (Kronenberger & Meyer, 2001). Later in childhood depression and anxiety can be better differentiated by the presence of physiological hyper arousal, which is characteristic of anxiety. Furthermore, the absence of positive affect also appears later in childhood which is characteristic of depression (Kronenberger & Meyer, 2001). With regard to the comorbidity of depression and anxiety, research suggests that depression in young people is more likely to occur after rather than before the onset of all other psychiatric disorders other than alcohol or substance abuse (Mash & Wolfe, 2004). Anxiety disorders are six times more likely to precede major depression than Dysthymia (Curry & Murphy, 1995). Most co-occurring disorders are often present before MDD and persist even after the depressive symptoms have subsided (Birmaher et al., 1996). Recent studies looking at comorbidity of anxiety and depression have found that these children tend to do worse on cognitive tasks then those children with anxiety alone, indicating the need for addressing

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comorbid condition due to its impact on a child's ability to learn (Ladouceur, et al., 2005).

Oppositional behaviors

It has been established over a decade ago that depression is also much more frequently seen in children and adolescents with conduct problems then the normal population (Zoccolillo, Pickles, Quinton, & Rutter, 1992). In fact, increased severity of antisocial symptoms is a good predictor of later mood disorder (Maughan, Rowe1, Messer, & Goodman, 2004). It was reported that although conduct problems and depression have been found to be associate, the degree of the association varies with child's age, gender, and diagnosis. Comorbidity with boys with conduct problems and depression is higher when younger and diminishes in adolescents and older age, where as for girls it remains a constant (Zoccolilo et. al., 1992). A recent study looking into conduct disorder found that significant rates of oppositionality persisted at similar levels from early childhood to middle adolescence (Maughan, Rowel, Messer & Goodman, 2004)

This combination of disruptive behaviors and depression can often make it more challenging for families to cope and greater emphasis can be placed on the oppositional nature of the presentation of the depression without addressing the underlying causes of the depression. These children can also express unhappiness, dissatisfaction, and sadness about their behavioral problems as they continuously get in trouble by adults. Oppositional behaviors observed in depressed children are associated with fewer classic depressive features (Kronenberger & Meyer, 2001). A classic depressive feature refers to

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a family history of depression, vegetative symptoms, and recurrent depressive episodes. Children, whose depression is accompanied with disruptive behaviors, have a higher risk associated with disruptive behaviors problems, including criminal behavior and suicide attempts (Birmaher et al., 1996). There is an overall lack of diagnostic clarity and distinction between depression and diagnoses which involve disruptive behaviors either as separate or comorbid disorders (Fisher, 1999).

Prevalence

The prevalence rate for MDD for children age 4 to 18 is between 2-8% (Mash & Wolfe, 2008). Studies for depression in the general population is more specific, reporting base rate of depression at 8% (Hawthorne et al., 2008). The variation in rates for childhood depression is mostly dependent on what age group was evaluated in the study. Specifically, in school age children, the prevalence rate for MDD is less than 1%, yet by adolescent years the prevalence rate increases to 8% (Mash & Barkley, 2002; Birmaher et al., 1996). Depression in adults has also been suggested to originate from adolescence (Harrington, Rutter, & Fombonne, 1996). One in 5 or 6 children experience diagnosable depression at some time during their childhood years (Birmaher et al., 1996). In 2010the National Institute of Mental Health (NIMH) estimated that as many as 11.2 percent of 13 to 18 year olds are affected with depressive disorder. Of those, 3.3 % have experienced a seriously debilitating depressive disorder (Merikangas et al., 2010). A study sponsored by the NIMH of 9- to 17-year-olds found that 6% developed depression in a six-month period, with 4.9% diagnosed as having major depression (Kessler, Chiu, Demler, & Walters 2005). Children and adolescents who experience early onset of depression are

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more likely to experience recurrences, and more likely to experience severe depression as adults. It has been suggested that although there has been no significant increase in the proportion of cases classified with major depression in the last ten years, the strongest predictor of depression was poor overall health status (Hawthorne et al., 2008).

Depression Sequelae

Research suggests the sequela of depression includes suicide and psychiatric illness (Gotlib & Hammen 2009, Chapter 18).

Psychiatric Illness

There is strong evidence of continuity between child and adolescent emotional disorders and adult psychiatric outcomes (Colman, Wadsworth, Croudace, & Jones, 2007; Fombonne, Wostear, Cooper, Harrington, & Rutter, 2001). For example, there is a strong relationship between substance use disorders and mood disorders, where research is clear that depression leads to substance abuse and dependence. Costello and colleagues (Costello et al., 1999; Kaplow, Curran, Angold, & Costello, 2001) found that depression and generalized anxiety disorder were related to the onset of adolescent substance use. Other studies have found that both depression and anxiety are comorbid with adolescent substance use disorders, but that relationship with depression is stronger (Fergusson, Horwood & Lynskey, 1993). In a foundational study by Suh and Carlson, (1979) it was reported that 60% children referred to a psychiatry unit presented with symptoms of depression. This rate is currently less due to the understanding of other conditions such as bipolar disorder, which the child may be diagnosed with in place of depression (Gotlib

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& Hammen, 2009). It has been established that there is a strong rate of recurrence of affective disorder especially for those who have longer episodes and early onset (Dunn & Goodyer, 2006).

Suicide

One of the strongest risk factors for suicide in youth is psychiatric disorder, especially depression (Shaffer & Pfeffer, 2001). For this reason it is important to understand suicide and it's risks. According to the American Psychiatric Association (2000), one of the major symptoms of major depressive disorder is suicidal thoughts or behavior. Every 2 hours and 4 minutes, a person under the age of 25 dies by suicide (McIntosh, 2006). Rates for suicide attempts in adolescents have been reported to be as high as 30-40% (Gotlib & Hammen, 2009). However, over three-fourths of the attempts are not serious enough to merit medical attention (Elnour & Harrison, 2008). Alarmingly, completed suicides have increased by 300% from 1970 to 2000 and have continued to increase. Consistent with adult statistics, adolescent girls make more suicide attempts where adolescent boys complete suicide four to five times more often than girls (Gotlib & Hammen 2009). Deaths by suicide is the third leading cause of death in the United States for adolescents, accounting for 11% of the deaths. As many and 27% of children with depression (Stark et al., 1991) and 60% of adolescents with depression (Wetzler, Asnis, Hyman, & Virtue, 1996) have serious suicidal ideations. Furthermore, firearms have been shown to be the most lethal suicide means followed by hanging, where the rates for suicide involving firearms are on the decline and hanging rates are rising (Elnour & Harrison, 2008).

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One of the most reliable risk factor for suicidal behavior is the presence of psychopathology. At least 90% of all youth who die due to suicide have at least one mental disorder which includes depression (Gould, Greenberg, Velting & Shaffer, 2003). In fact, mood disorders and substance use disorders are the most common of all pathology shared by those who commit suicide (Moskos, Olson, Halbern, Keller, & Gray, 2005). Other studies have shown that both mood and anxiety disorders with childhood onset (prior to age 13) have been found to elevate risk for multiple, non-lethal attempts in young adulthood (Rudd, Joiner, & Rumzek, 2004). In fact, Wetzler and colleagues (1996) examined characteristics of suicidality and psychopathology (depression, aggression, impulsivity, stressful life events) in 4 groups of depressed adolescent patients: (1) suicide attempters who need medical treatment; (b) suicide attempters who did not need medical treatment, (c) suicidal ideation who had never made an attempt, and (d) nonsuicidal patients. They found that the 3 suicidal groups could be differentiated from one another on the basis of suicidality but not psychopathology. They concluded that depressed mood is fundamentally associated with suicidality of all kinds, "even months and years after the suicidal behavior has been exhibited" (Wetzler,et al., 1996).

Hospitalized Children's Risk

Children who are hospitalized are undergoing various levels of stressful events that puts them at an increased risk for depression (Sukantarat, Greer, Brett, & Williamson, 2007). Patients who survive a medical condition have been found to have depression up to nine months following discharge, which is largely impacted by delayed recovery. The diagnosis, its chronicity, and level of trauma the child has endured along

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with risk and protective factors, can determine to what degree each child is being psychologically impacted. In addition, the experience of being involved in the medical setting, having a variety of medical needs and symptoms, can have a psychological, behavioral and cognitive impact on children. An important reason why children in the hospital may report depressive symptoms is the fact that they have been removed from their home, family and friends. When children are removed from familiar environment, coping with a medical condition can be that much more challenging. Although it can be perceived that depression in the hospitalized medical population is due to this separation from familiar environments, several studies have shown that the depression in the pediatric population is not necessarily due to being hospitalized (Kashani et al., 1981). Children can get severely depressed following a medical procedure or illness which makes the exact reason for the increase in depressive symptoms more closely associated with the stressors related to the medical condition rather then the contextual factors of being in the hospital. Children who are hospitalized can have a difficult time adjusting to other aspects of their lives following discharge. Understanding and detecting the depression should be an important aspect of their medical care.

There are various congenital conditions which can potential put children at greater risk for developing depression (Mash & Wolfe, 2008, Chapter 18). Research has not thoroughly looked at this matter, given that the focus has mainly been on child's developmental trajectory when looking at congenital issues. It has been suggested that although some children may cope well with a life long condition, there are still those children who struggle with healthy coping and have longer term psychological impact due to their condition (Birks, Sloper, Lewin, & Parsons, 2007). There is an increased risk

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of negative psychosocial outcomes which includes low self-esteem, increased anxiety and depression for children with a congenital condition (Birks et al., 2007). These children also have an increased risk for poor social and behavioral adjustment in comparison to children who do not have a congenital condition.

Studies looking at hospitalized children's symptoms of depression have mostly focused on the psychiatric population. Looking at depressive symptoms in acute care for the pediatric population is fairly limited. In addition, research in this area is outdated and most studies were conducted over 20 years ago. Depression is very much a reality in the hospital setting for children. One older study looking at this population found that about 20% of referrals form a pediatric oncology center is due to symptoms of depression (Rait, Jacobsen, Lederberg & Holland, 1988). It has been suggested that hospitalized children who present with somatic complaints, anxiety symptoms and behavioral problems may be suffering form depression (Neumann & Inwood, 1993). A study looking at the frequency of depression in children between 7 and 12 years old admitted in non-psychiatric setting of pediatric inpatient ward found that 7% of the children met criteria for major depressive disorder and also endorsed items on self-report measure in the clinically significant range for depression (Kashani et. al., 1981). It is reported in this study that 7% of children admitted for medical illness to general pediatric inpatient wards meet criteria for Major Depressive Disorder. A recent study looked at the impact of continued hospitalization due to a chronic condition reported higher rates of depression compared with children without chronic conditions (Curtis & Luby, 2008).

It is also apparent that in a medical care setting, most children who meet criteria for depression are not having their mental health needs addressed. Looking at children

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being admitted for cardiology outpatient clinic, one study found that more than half endorsed dysphonic mood and 13% were given the diagnosis of depression (Kashani, Lababidi, & Jones, 1982). In a landmark study by Kovacs et al (1990), children with diabetes were looked at 3 months post diagnosis. This study found that children with diabetes exhibit sufficient symptoms to warrant a diagnosis such as depression and adjustment disorder with depressed mood. Interestingly, at 6 months follow up, 31% of the children had developed at least one new psychiatric disorder after the adjustment phase where the most common diagnoses were major depressive disorder, anxiety disorder, and dysthymia. Some studies have found a relationship between depressive symptoms and death from asthma in childhood (Strunk, Mrazek, Fuhrmann, & Labrecque, 1985), indicating that the effects of depression in pediatric illness can be significant.

Although various studies have concluded that depression in the pediatric population has increased, the conclusions that can be drawn from this are limited (Burke, 1991). As well, the effect of depression on the course or outcome of pediatric illness is not well known. Most studies are cross sectional and only a few have attempted to look at specific items endorsed in order to better understand how various medical conditions report depression. Despite these limitations, the evidence suggests that depression is more common in children with pediatric illness than the normal population. Diagnosis of depression in the presence of pediatric illness has not been an area looked at in research (Burke, 1991). A review of how depression presents in various medical conditions will be discussed based on conditions commonly seen in pediatric units.

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Depression in Cancer Patients

When looking at various medical diagnoses presented in acute care settings, cancer is an important diagnosis to consider given its prevalence. Cancer is the second leading cause of death among children in the United States (Jemal, Ward, Hao, & Thun, 2004). In 2001, cancer accounted for 11.7% of all deaths in children under 15 years of age, second only to injuries, which accounted for 37.3% of all deaths. Cancer is the second most common cause of death among children between the ages up to 14 years old, surpassed only by accidents (Jemal et. al., 2009). One of the most common psychiatric disorders related to the diagnosis and treatment of cancer is depression. Major depressive disorder severely impairs the quality of life of patients with medical disorders such as cancer, but evidence to guide its management is scarce.

For numerous reasons there is potential for psychological disorders in children with cancer which include increased risk of impaired cognition, emotion and self-esteem, poorer social competence, distress, anxiety/depression, chronic fatigue, conduct disorder, and psychotic symptoms have each been associated with childhood cancer (Boman, Lindahl, & Bjork, 2003; Dahlquist, Czyzewski & Jones, 1996; Hoekstra-Weebers, Jaspers, Kamps & Klip, 2001; Libov, Nevid, Pelcovitz & Carmony, 2002). Although research has shown that this increased risk exists, symptoms are usually clumped together in terms of "depression" or "anxiety" rather then focusing on specific symptoms for this medical population. Child depression measures such as the Children's Depression Inventory (CDI) has been used in studies of patients with cancer. One study comparing children with cancer, psychiatric inpatients, and healthy controls found that psychiatric inpatient population have the greatest amount of depression followed by those children

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with cancer, where both groups demonstrated greater depression then the control group (Worchel, Rae, Olson, & Crowley, 1992). Another study found that just going through the process of having a cancer work-up increased chances for depression and anxiety in children (Merrill et. al., 2007). Specifically, Merrill and colleagues (2007) reported that less than 20% of cancer workups are followed by cancer diagnosis and treatment. However, having gone through the cancer workups was found to increase the risk for depression by 89% when compared with children never required to have a cancer workup. Therefore, it was concluded that a cancer workup alone can be sufficient to significantly increase the risk of anxiety/depression in children.

When looking at predictors of depression and psychosocial adjustment related with medical illness such as cancer, research has focused mostly on the family's adjustment, coping, and mental health rather then the child's symptoms. For example, majority of studies regarding depression and cancer focus on the parent's depression of children with cancer. Research has shown that stress was positively associated with symptoms of depression in children and negative affect is positively associated with both anxiety and depression (Miller et. al., 2009). Studies such as this one point out the importance of an integrated model for treatment of these children, which would include their mental health in addition to medical care. For example, Miller and colleagues present a model to identify children at risk for internalizing symptoms related to cancer-related stress, coping difficulty and negative affect. There is a need for additional research in order to guide appropriate interventions for medically ill children with depression.

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Orthopedic Injury

Another commonly seen condition on pediatric units is orthopedic injuries such as broken leg, arm, or another other form of injury inflicted on the child as a result of a fall or being stuck by something. When physical handicaps are severe enough to cause for hospitalization, it is very likely that emotional consequences to the physical condition will also arise in children. Each year, thousands of children are hospitalized simple for an orthopedic injury of which the average amount of stay in the hospital can range from days to several months, depending on the severity of the injuries and need for surgical procedures. Current research is limited in the area of mental health for children with orthopedic injury.

These children may feel fear due to the hospitalization and the physical pain. Assessment of the depressive symptoms they present with can be a helpful screening tool to detect which children may need additional intervention to help cope with their physical limitations. The primary focus of orthopedic injury is a loss of some sort or an actual change in the appearance or function of one's body (Cournos, 2002). The loss can also be generalized to a loss in opportunity for the child to play, loss of ability to complete physically with other children, and loss of acquired body mastery and normal body image (Kashani et. al., 1981; Cournos, 2002). In fact, outcomes research has exposed evidence of widespread psychological distress following orthopedic trauma. Although psychological distress is strongly associated with patient outcome, including functional outcome following trauma, no study evaluating the ability of clinicians to treat psychological distress after musculoskeletal trauma has been reported in literature (Starr, 2008). In addition, orthopedic studies routinely control for psychological distress when

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evaluating outcome. Psychological distress after trauma, with its large impact on trauma outcomes, remains a substantial problem that is usually ignored and untreated (Starr, 2008).

Children with orthopedic injury are at greater risk for depression (Kashani et al., 1981). Dysphonic mood and depression is the most common symptoms found in this population (Davydow, Katon, & Zatzick, 2009. Guilt, fatigue, and suicidal ideations have been identified as the most common symptoms experienced by children with orthopedic injury (Kashani et. al., 1981). Furthermore, parents tend to report their children with orthopedic injuries to be anxious and irritable and to have sleep disturbance. Although studies done with the pediatric population specific to injuries is rare, one study found that Post Traumatic Stress Disorder and depression are quite prevalent in patients presenting at intensive care units with traumatic injuries (Davydow et al., 2009).

Neurological Conditions

Another common condition observed on pediatric units is brain trauma. Nearly 475,000 children ages 0- 14 acquire a brain injury each year of which the highest rates are for children ages 0-4 (Langlois, Rutland-Brown, & Thomas, 2005). Majority of these TBI's are mild but about 10-15% result in severe injury. The leading causes of trauma are motor vehicle accidents, falls, and assaults. In addition, trauma is the leading cause of death among children under 4 years of age in the United States. Amongst all age groups, TBI is the fifth leading cause of death in the United States and creates a substantial burden on society in terms of lost productivity, increased disability, as well as the consumption of health care resources (Centers for Disease Control, 2004). There are a number of negative

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outcomes following more severe injuries including intelligence, memory, language, nonverbal skills, attention, and executive function difficulties (Yeates, 2000). Along with neurological consequences, behavioral consequences include irritability, agitation, impulsivity, confusion, apathy, and emotional liability (Barry, Taylor, Klein & Yeates, 1996). There is also research to support the increased risk for depression for this population (Barker-Collo, 2007). The work of Barker-Collo (2007) demonstrated an awareness piece to TBI, which can be the reason for the higher rates of depression. In the study it was found that severe TBI had more thought and attention problems, and to a lesser extent social problems, where as mild to moderate TBI exhibited more somatic and depressed symptoms.

A reason for the detected depression in TBI population is from 2 sources. The insult in regions of the brain in charge of emotional regulation can disrupt the system of emotion expression and neurochemical and neuendocrine system (Ownsworth & Oei, 1998). Also, the indirect impact of the injury which impact the child's level of functioning across different setting such as at home with their self-help skills and at school with academic performances can constitute emotional distress. The decline in school performance, loss of relationships and increased dependence in daily living skills can cause emotional disturbance (Kirkwood et. al., 2000). Study by Kirkwood et al. (2000) utilized the CDI to assess for depression in children and concluded that the total scores on the CDI did not change over time for those with a TBI but declined significantly for those with only orthopedic injuries, suggesting a continuous state of depression following brain injury. Children with TBI were at 6 times greater risk for

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higher levels of depressive symptoms at 6 months follow up from the time of injury than children with orthopedic injuries alone.

In regards to psychosocial outcome following a brain injury, depression has been found to be significantly associated with negative psychosocial outcome (Draper, Ponsford & Schonberger, 2007). Depression and fatigue has been reported to being a possible means of improving long-term psychosocial outcome following TBI. In addition, self-reported fatigue and depression were found to be the strongest predictors of aggression at 10 years following brain injury (Draper et al., 2007). Similar to the presentation of depression in non-neurologically related conditions, there is a strong relationship with negative psychosocial functioning for children who are depressed.

Chronic Conditions

Conditions which can be categorized as chronic are often the cause for repeated hospital visits. Epidemiological studies have shown that chronically ill children are at increased risk for psychiatric disorders (Cadman, Boyle, Szatmari & Offord, 1987) yet little is still known on the prevalence of depression in specific diagnoses or the contribution illness and hospitalization has on childhood depression. The numbers of youth under age 18 who experience a chronic health condition is estimated to range from 10 to 30% and are rising due, in part, to significant advances in medical care that reduce mortality (Newacheck & Taylor, 1992; Curtis & Luby, 2008). Out of these children, approximately 5% of them are affected by conditions that are severe enough to limit their activities. These children account for 24% of all school absences, 19% of physician visits, and 33% of hospital days (Newacheck & Taylor, 1992). Improved treatments result in

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better mortality rates; hence, the concern has been voiced about the quality of life for these children with chronic conditions. A large-scale study looking at over 2000 children with chronic illness found that they were at twice the risk for having emotional disorders including depression (Turgay & Ansari, 2006). This study also found that chronically ill children were at 1.6 times greater risk for having poor peer relationships.

One common chronic condition on pediatric units is diabetes. Studies have shown that individuals with depression are at greater risk for developing diabetes (Brown, Majumdar, Newman, & Johnson, 2005; Campayo et al., 2010). According to an evaluation of 20 studies over the past 10 years, the prevalence rate of diabetes with major depression is three to four times greater than in the general population. According to the American Diabetic Association, while depression affects about three or five percent of the population at any given time, the rate is between 15 and 20 percent in patients with diabetes. In addition, having a family history of diabetes increases the risk for sever depression (Irving et. al., 2008). It has been suggested that children with diabetes have been found to be two times more likely to have depression, and adolescents are three times more likely to have depression when compared with youth without diabetes (Grey, Whittemore, & Tamborlane, 2002). A common view is that the burden of having diabetes contributes to the development of depression. It has been suggested that diabetes related emotional problems are particularly common (Kokoszka et. al., 2009). Other chronic conditions such as spinal cord injury have also been found to be associated with greater levels of depression (Anderson et. al, 2009). In fact, children's depression appears to impact not only their level of independent functioning for this population but also their quality of life.

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Assessment of Depression

As we become more aware of depression and its effects on children, the assessment of this disorder becomes increasingly important. Assessment of a depressed child is a multifaceted task. There are various methods used for assessment which have improved over the years, as children's depression became better understood.

Clinical interviews along with rating scales identify accurate diagnosis of depression and its severity (Burke, 1991). Traditionally self-reported measures, clinical interviews, and diagnostic criteria are the main sources used to diagnose depression. The assessment and diagnosis of depression has advanced over the years with the development of clinical rating scales, which measure symptoms severity (Kazdin, 1990). Interviews can be structured or semi-structured in nature and require trained professions to spend a good amount of time with the patient. Self-rated (self reported) inventories play a significant role in research and have clinical purposes. Self reported measures of depression have long been used to assess for depressive symptoms and aid in diagnosis.

In the medical setting, assessment for issues such as depression can go unnoticed due to the primary treatment focus being medical care. Devoting enough time to assess for emotional needs of children in the hospital is often not possible as trained professionals spend a limited amount of time with the patients. This often leaves out the mental health aspect of children's health, leaving detection of depression unrecognized. Ideally, bedside assessments can be done while the child is hospitalized to help identify the children who are reporting emotional distress. Upon discharge, proper recommendations can be made to prevent the long-term impact of depression.

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Statement of the Problem

In summary, many studies have suggested that children with significant medical histories are at greater risk for depression. Depression is more prevalent in pediatric illness than in the general population. Research has suggested that risk factors for depression include facing stressful events such as a medical condition, which may require hospitalization. Pediatric illness can function as a major stressor that precipitates depression in children vulnerable for other reasons as well (Burke, 1991). Once children are discharged from hospital setting, they are impacted by decreased academic performance and diminished social relationships. These negative outcomes can be a result of various causes such as actual cognitive impact of their medical condition, issues related to self-esteem incorporated with medical illness, as well as the impact of being hospitalized. Depression has been long linked with non-compliance to medical regime which impacts long term care for this population. In addition, suicide is one of the dim realities of depression in children.

There are various experiences associated with being hospitalized which can impact children. Other than the actual impact of the medical condition, the experience of being in the hospital can also have a negative effect on a child's mental health. Once in the hospital, children are removed from their familiar environment such as their home, neighborhood, peers, and school. Duration of time spent with family also changes due to limitations put on visitation hours and number of visitors allowed along with other variables that hinder families' ability to visit. While in the hospital there are various professionals who are strangers to the child, with whom they come into contact with. These experiences can have a profound impact on a child's psychological health.

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There are gaps in literature in pediatric depression. Limited amount of studies have looked at addressing the needs for the hospitalized pediatric population. Studies specifically looking at depression immediately following and particularly during hospitalization are also scarce. When assessing the impact of trauma on children, research mainly focuses on long-term follow-up. In addition, studies which look at hospitalized children in regard to depression focus primarily on the psychiatric population. To date, there have been no studies breaking down the various symptoms of depression and looking at how they present in various medical diagnoses in children which is the purpose of this study. Furthermore, current research in depression primarily takes an all or none format to diagnosis. Children in most studies are categorized as either depressed or not depressed, using the DSM criteria. Assessments used for diagnosis only consider the total score for depression and fail to look at specific items endorsed. This leaves out understanding of specific symptoms of depression, which can only be addressed when looking at subscales and individual items endorsed.

The purpose of the current study was to look at whether or not children hospitalized for various medical conditions report symptoms of depression. The role of age, gender, and length of hospitalization was also considered for this population. In addition, an exploratory part of this study looked for trends in various diagnoses through analysis of the types of symptoms endorsed. Particularly, children with the following diagnoses were compared on all subscales of depression as measured by the Children's Depression Inventory (CDI): cancer, orthopedic injury, congenital disease, non accidental injury (i.e. gun shot wound, stab wound), spinal cord injury, diabetes, chronic illness, and psychological distress. Because research looking across such wide variety of diagnoses is

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limited, it is believed that this study adds to the understanding of childhood depression as it presents outside of psychiatric settings. In addition, this study provides a baseline of psychological symptoms in pediatric population. Information can be used to inform professionals of future risk, implications for treatment adherence, and adjustment to the medical condition. To accomplish these goals, four specific aims and associated hypotheses are proposed in addition to an exploratory question.

Study Aims and Hypotheses

Aim 1. To examine the presence of depression in pediatric hospitalized population:

H1: Children in the hospital will show elevated levels of depression when compared with the normative sample. In particular, the anhedonia subscale is predicated to be significantly higher for the patient population then the normative sample.

H2: Those children who are hospitalized will have higher levels of depressive symptoms compared to a purely clinical sample of children with a mood disorder who are not hospitalized for a medical condition.

Aim 2. To examine the factors which may contribute to depressive symptoms:

H3: Those children hospitalized for longer amount of time, from time of admittance to time the CDI was administered, will have higher levels of depressive symptoms.

Aim 3. To examine participant characteristics associated with depressive symptomatology:

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H4: Older children will report greater level of depressive symptoms when compared with younger children. The 5 subscales of the CDI will be analyzed to better understand which symptoms are most prominent in younger children and how symptoms differ with age.

H5: Males will have significantly greater elevation on the ineffectiveness scale when compared with females.

Aim 4. To examine medical diagnosis and how various conditions exhibit depressive symptoms:

H6: Children with chronic conditions will have higher levels of depressive symptoms than those children who do not have a chronic condition.

H7: Due to literature demonstrating that children who have experienced a traumatic even are in fact resilient and do no demonstrate levels of psychological distress as expected; it is hypothesized that children who are hospitalized with a traumatic event will not exhibit greater levels of depressive symptomatology when compared with those children who are hospitalized for a non trauma related event.

*Exploratory question***.** In order to gain much needed understanding on how hospitalized children report symptoms of depression and how the symptoms can differ depending on medical diagnosis, an exploratory part of this study will look at various diagnoses across the specific symptoms of depression. Specifically, groups of children referred by various units for their medical conditions including tumors, orthopedic injuries, congenital conditions, neurological conditions, diabetes, present complaints/isolated symptoms, and suicide attempts will be analyzed across all the subscales of the CDI.

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CHAPTER TWO

METHODS

Sample

Archival data was used for the sample of children seen at the Loma Linda Children's Hospital and East Campus Rehabilitation Center who were followed by the Pediatric Neuropsychology team. These children were referred for Pediatric Neuropsychology Consultation/Liaison services for coping and adjustment, cognitive abilities assessment, and/or behavioral management primarily from oncology, general pediatrics, endocrinology and neurology units. Referrals to the team included ages 0-22 year olds at the Loma Linda Children's Hospital and 6-17 year olds at East Campus rehabilitation center. The length of stay for patients varied and brief assessment was conducted regarding the patients current psychosocial or neuropsychological functioning. Patients included in the study were those whose archival research file contained the Children's Depression Inventory (CDI) as part of the assessment measures administered to them while in the hospital. Due to the CDI norms, the sample was limited to children 7 to 17 years old.

Procedure

The current study used archival data. In order to become eligible for participation, a child had to have an initial consult with the Pediatric Neuropsychology Consultation/Liaison Team. The pediatric neuropsychology team at Loma Linda University, comprised of clinical psychology doctoral students, post-doctoral fellows and licensed psychologists, provide consultation/liaison services at the Loma Linda

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Children's Hospital. Once a patient was referred to the team, the initial consultation occurred within the first 24 hours and the patient was followed by the team for the duration of their hospital stay. During one of such visits with the patient, the CDI was administered. The CDI was only administered to patients who were oriented to person, place, time, and situation. The child generally completed the questionnaire while the team member was charting or waiting in the room with the patient. If there were any limitations to the child's ability to read or comprehend the items on the questionnaire, the measure was orally administered to them. Feedback on the patient's status was provided to the referral source, patient, and family.

Measures

Patients were asked to complete the Children's Depression Inventory (CDI) as part of their treatment at the medical center. The CDI was developed in response to the need for direct assessment concerning children's mental health (Kovacs, 1992) and is the most widely sited and clinically used measure of childhood depression (Sorensen, Frydenberg, Thastum, & Thomsen, 2005). The CDI is a 27 item self-reported measure assessing for depressive symptoms experienced in past two weeks. It is designed to make quantitative measurements of the following symptoms of depression: mood disturbances; capacity for enjoyment; depressed self-evaluation; disturbances in behavior toward other people; and vegetative symptoms, which include fatigue, oversleeping, having difficulty with activities requiring effort, and other symptoms of passivity or inactivity. The subscales on the measure are as follow: Negative Mood, Interpersonal Problems, Ineffectiveness, Anhedonia, and Negative Self-Esteem. Negative Mood scale includes

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items regarding the child's sad affect. The Interpersonal Problems scale includes items regarding how a child relates with his or her peers. Furthermore, Ineffectiveness items question how well the child feels he or she is able to complete tasks. The Anhedonia scale includes items regarding overall motivation to engage in activities. Lastly, the Negative Self-Esteem scale includes items regarding how the child views themselves. See Appendix A for list of specific items. Once the raw scores are totaled up they are computed into T-scores based on normative sample divided by age and gender (Kovacs, 1992). The items are added to give a total score for depression with higher scores indicating more depressive symptomatology. T-scores above 60 suggest a clinically relevant elevation.

The CDI has good psychometric properties with high internal consistency. Construct and criterion validity studies have shown that the CDI relates to self- esteem, hopelessness, cognitive processing, and depression as measured by other instruments (Kazdin, 1990; Kovacs, 1992). Research has concluded the CDI to be a reliable and valid measure used to assess for depression (Smucker, Craighead, Craighead, & Green, 1986; Kazdin, 1990; Reinhard, Bowi, & Rulcovius, 1990; Larsson & Melin, 1992; Sorensen et. al., 2005). CDI has shown to be a stable measure for diagnosis of depression over repeated hospital admissions. Even in a psychiatric setting, the results of the CDI were consistent at initial 10 and 30 day intervals; demonstrating stability of the measure (Nelson, 1990). Researchers reported that even with the expected changes in mood, the CDI presents to have stability that can be used for diagnostic purposes. The diagnostic accuracy of the use of CDI in medically ill children has been evaluated comparing CDI self-report with diagnostic interview using DSM criteria in a double blind study

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(Shemesh et. al., 2005). Shemesh and colleagues (2005) found that CDI could be used as a diagnostic aid in medically ill children who are identified as having emotional problems by their physician. As a result, investigators of this study have concluded that self-report measures are accurate. Research suggest that regardless of identification of the physical complaints in hospitalized population, depression as identified by CDI is similar to what is identified as depression through diagnostic interview and DSM criteria (Shemesh et. al., 2005). Although its validity and reliability has been established, it should be noted that the use of the CDI should be done with caution and in conjunction with other forms of evaluation for an accurate diagnosis. The CDI can contribute significantly to the assessment of a child's depression related distress (Kronenberger & Meyer, 2001).

Proposed Analyses and Variables

The independent variables in this design were predictors of depression, which include length of hospitalization, gender, age, diagnosis, presentation of trauma, and chronicity of disease. The dependent variables were depression scores as measured by the CDI, which included five subscale scores (Anhedonia, Negative Mood, Self Esteem, Ineffectiveness, and Interpersonal Problems) as well as the CDI total score.

Hypothesis 1: To determine if children in the hospital had elevated levels of depression compared with the normative mean, group mean scores and standard deviations for all the participants in the study, were calculated for CDI total score and the five subtests. Their scores were compared with published norms available from the CDI manual and then analyzed by a paired samples t-test.

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Hypothesis 2: To evaluate if children in the hospital for medical care had higher levels of depression compared with children with mood disorder only, a paired samples t-test was conducted to compare the hospitalized and non-hospitalized groups. Norms for the comparative group of children with a mood disorder were taken from the CDI manual. The published norms available were taken from a clinical sample of 184 children diagnosed with a Major Depressive Disorder, Dysthymic Disorder and Adjustment Disorder with depressed mood who did not have a medical condition. Group mean scores and standard deviations for the hospitalized group were calculated for CDI total score and the five subtests and included all the participants in the study.

Hypothesis 3: To determine if those children hospitalized for a greater amount of time have greater level of depression, a multiple regression analysis was conducted to examine the effects of length of hospitalization on depression levels. The amount of time was measured by number of days from the time the patient was admitted to the unit to the date the CDI was administered. Hospital records were reviewed to obtain date the patient was admitted. Potential covariates were included in the model in order to control for their effects when looking for the effects of length of time hospitalized.

Hypothesis 4. To determine if older children have greater depressive symptoms as measured by the CDI, a correlation analysis was conducted to evaluate the potential effect of age and total depression score on the CDI.

Hypothesis 5. To evaluate if males had greater elevation on the ineffectiveness scale when compared with females, an independent-samples *t*-tests was used to evaluate differences in ineffectiveness subscale symptom severity.

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Hypothesis 6. In order to evaluate if children hospitalized with a chronic condition had higher levels of depression, an independent samples *t*-test was used. Chronicity variable was also dichotomized, where chronic conditions were compared with non-chronic conditions. A condition was considered chronic that was long-lasting or recurrent. By definition, chronic could refer to a persistent and lasting medical condition. For the purpose of this study, any condition for which a child had been hospitalized for more than once was considered chronic. In addition, those medical conditions which had been diagnosed more than six months ago and was the condition for which the child was currently being treated for was also considered as a chronic condition.

Hypothesis 7. In order to evaluate the hypothesis that children hospitalized for a traumatic event would not have greater levels of depression when compared with those who were hospitalized for a non-traumatic event, a paired samples *t*-test was conducted. Trauma variable was dichotomized including those diagnosed with sudden onset compared with non-traumatic events. Specifically, the reason for why the child was hospitalized was considered in order to determine if their reason for hospitalization was a result of a traumatic event.

Exploratory Question 1. In order answer the exploratory question of how children with different medical diagnoses report depression, participants were grouped in 5 groups which included the following: tumors/cancer, orthopedic injuries, congenital conditions, neurological conditions, and other conditions. These groups were analyzed across all CDI subscales. Because the dependent variables of CDI subscales are related, a correlation analysis was conducted to determine if multivariate analysis of variance (MANOVA) might be more appropriate than separate analysis of variance (ANOVA) procedures.

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MANOVA can be used to protect against inflated Type I error (Tabachnick & Fidell, 1996). In addition, MANOVA can lessen the redundancy of separate ANOVAs of theoretically and statistically related outcome measures because the intercorrelations can be considered in the analysis (Weinfurt, 1995).

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CHAPTER THREE

RESULTS

Statistical analyses were performed using SPSS version 12.0. Below is a description of the data analysis procedures as they related to the study aims and a description of the sample population. The aims of the study and its findings are presented first, followed by the analysis of the exploratory questions.

Given that this study was conducted on archival data, power analysis was conducted for each hypothesis in order to evaluate if sample size was sufficient enough to detect significance. Power analyses were conducted with GPower 3 (Erdfelder et al., 1996), evaluating the *a priori* sample size required to detect a medium-sized effect (f = .25; Cohen, 1988) for the group x CDI scale interaction. The assumption of homogeneity of variance was assessed using Levene's test for the univariate analyses.

Sample Characteristics

The study sample consisted of 54 participants, out of a database of over 200 children who were administered the inventory. The mean age of the sample was 14.3 (*SD* = 2.58, range 8-17 yr.) and 61% of participants were male. Average number of nights spent in the hospital was 12.6 days (SD = 16.4, range 0-69 days). Further analysis of data for length of hospitalization demonstrated a negatively skewed curve, where most children were hospitalized for a shorter number of days. In fact, 63 % of the participants' hospital stay was 10 days or shorter. Demographic information is presented in Table 1.

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Table 1.

Participant Characteristics (N = 54)

Frequency data		
	N	%
Male participants	33	61.1
Female participants	21	38.9
Descriptive statistics		
	M	*SD*
Age	14.3	2.58
Length of hospitalization	12.6	16.36

Aims of the Study

Aim one

To examine the presence of depression in pediatric population.

Hypothesis 1

It was hypothesized that children in the hospital would show elevated levels of depression when compared with the normative sample. In particular the anhedonia subscale was predicted to be significantly elevated for children in the hospital compared with the normative sample. The mean scores for the CDI total score and five subscales were compared with norms published in the CDI manual from data collected between 1979 and 1984 of 1,148 children in Florida public schools. Results indicated that the patient population reported less depressive symptoms across all subscales as well as CDI total scores. Independent groups t-tests for mean analysis were used to evaluate differences in means for CDI total and subscale scores between the participants and

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normative sample. The analysis demonstrated Negative Mood to be significant, t (1,200) = 2.35, p = 0.02. These results indicate that children who were hospitalized for a medical condition report significantly fewer symptoms related to negative mood (M = 1.56, *SD* = 1.77) on the CDI than the normative sample (M = 2.21, *SD* = 2.00). There was also significant difference found for the Ineffectiveness scale, t (1,200) = 3.26, $p < 0.01$. These results also show that children who are hospitalized for a medical condition report fewer symptoms related to ineffectiveness (M = 1.08, *SD* = 1.44) on the CDI when compared with a normative population (M = 1.90, *SD* = 1.82). Negative Self-Esteem scale was also found to be significant, t (1,200) = 3.99, $p < 0.01$. Similarly, those hospitalized report fewer symptoms related to negative self-esteem (M = 0.82, *SD* = 1.25) on the CDI then the normative sample (M = 1.82, *SD* = 1.82). CDI total score for the number of depressive symptoms reported was significant t (1,200) = 2.49, p = 0.01, indicating that children who were hospitalized admitted to having less overall depressive symptoms (M = 7.46, *SD* = 6.46) then the normative sample (M = 9.98, *SD* 7.29). The results are shown in Table 2 below. Hypothesis 1 was not supported based on these results.

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Table 2.

Scores for patients compared with published norms

	Patients (n =54)		Norms (n = 1,148)	
	Mean	*SD*	*Mean*	*(SD)*
Subscale 1- Negative Mood	1.56*	(1.77)	2.21	(2.00)
Subscale 2- Interpersonal Problems	0.64	(.93)	0.77	(1.22)
Subscale 3- Ineffectiveness	1.08**	(1.44)	1.90	(1.82)
Subscale 4- Anhedonia	3.31	(2.74)	3.28	(2.66)
Subscale 5- Negative Self-Esteem	0.82**	(1.25)	1.82	(1.82)
CDI Total Score	7.46**	(6.46)	9.98	(7.29)

*p < .05, **p <.01

Power analyses were conducted with GPower 3 (Erdfelder et al., 1996), evaluating the *a priori* sample size required to detect a medium-sized effect (f = .25; Cohen, 1988) for the group x Total Score interaction. Assuming two-tailed alpha = .05, adequate power (.80) to detect a medium-sized group x Total Score effect (f = .37) was achieved with a total sample size of 54, see Figure 1. Therefore, the sample size of 54 was adequate to detect a medium sized effect. Individual power analyses were conducted on the group x subscale interactions, which concluded that the subscale that found no significance did not have sufficient power. To detect a medium-sized group x Anhedonia effect (f = .19) and Interpersonal Problems (f = .15), sufficient power was not reached. On the other hand, for group x Negative Mood interaction, a power of .69 was sufficient in detecting a medium effect size (f = .34). Power results are displayed in Figure 2.

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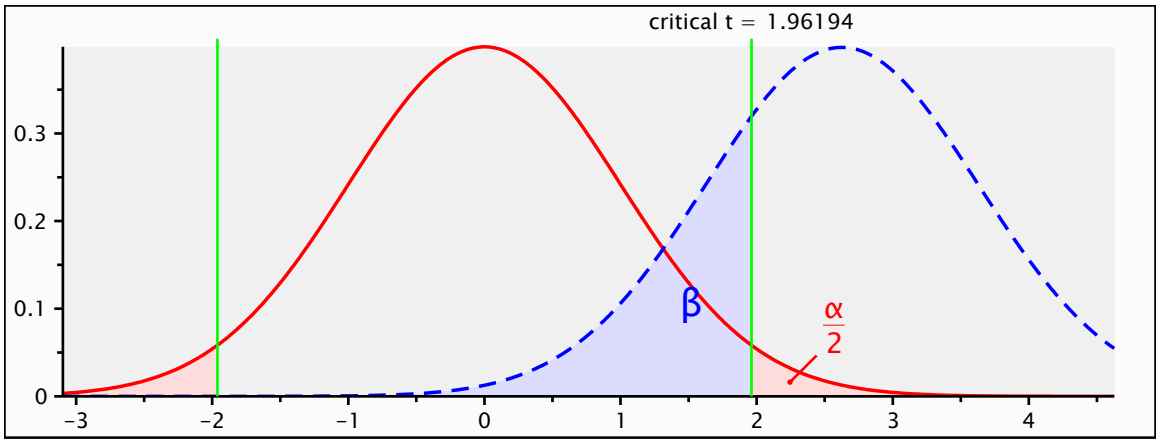

Figure 1. Power analysis for group x CDI total

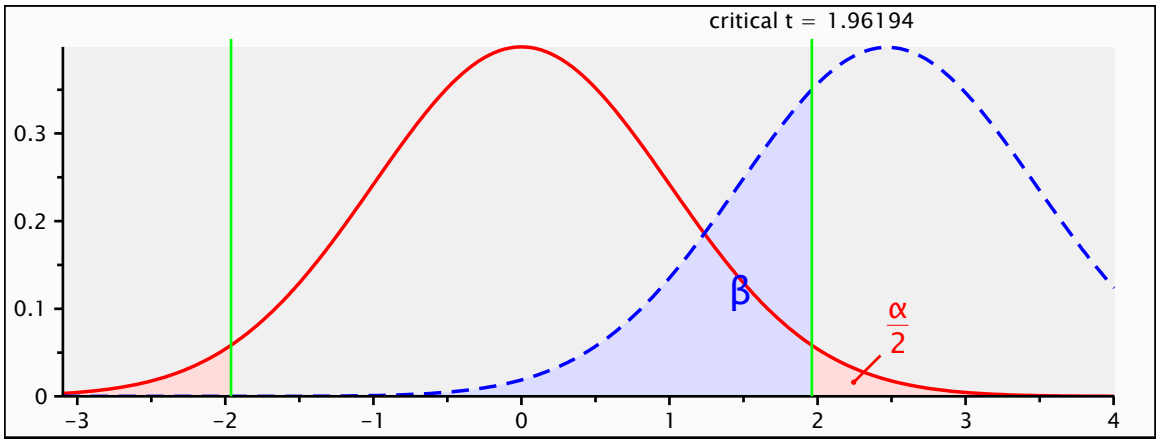

Figure 2. Power analysis for group x Negative Mood

Hypothesis 2

It was hypothesized that children who are hospitalized would have greater number of depressive symptoms when compared to a clinical sample of children diagnosed with a mood disorder who were hospitalized for psychological condition. Mean scores for the CDI total score and five subscales for participants were compared with published norms from a clinical sample in the CDI manual of 134 children diagnosed with a mood

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disorder (Major Depressive Disorder, Dysthymic Disorder, Adjustment Disorder with depressed mood). Independent group t-tests for mean analyses were used to evaluate differences in means between the participants and the clinical norming sample. The analysis demonstrated that across all subtests and the total score, the clinical sample reported a significantly greater number of depressive symptoms when compared with the hospitalized children. With regards to the CDI total score, the difference was significant, t (1,200) = 2.35, p = 0.02, suggesting that children diagnosed with a mood disorder report greater amount of depressive symptoms (M = 14.5, SD = 9.0) when compared with the children hospitalized for a medical condition (M = 7.46, SD = 6.46). Negative Mood was found to be significant, t (236) = 4.53, $p < 0.01$, suggesting that children who were hospitalized for a medical condition report fewer symptoms related to negative mood (M = 1.56, SD = 1.77) when compared with the clinical population (M = 3.31, SD = 2.3). Interpersonal Problems also was found to be significant, t (236) = 3.76, $p < 0.01$. Children who were hospitalized for a medical condition reported fewer symptoms related to interpersonal problems (M = 0.64, SD = 0.93) on the CDI compared to the clinical population (M = 1.5, SD = 1.6). Ineffectiveness was significant, t (236) = 5.20, $p < 0.01$; indicating children who were hospitalized for a medical condition reported significantly fewer symptoms related to feeling ineffective (M = 1.08, SD = 1.44) than the clinical population (M = 2.6, SD = 2.0). In addition, Anhedonia was also found to be significant, t (236) = 3.35, p = 0.01; suggesting that children who were hospitalized for a medical condition reported significantly fewer symptoms related to anhedonia (M = 3.31, SD = 2.74) then the clinical population (M = 5.0, SD = 3.4). Finally, results were also significant for the fifth scale, Negative Self-Esteem, t (236) = 5.26, $p < 0.01$, suggesting

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that that children with a medical condition reported significantly fewer symptoms related to self-esteem (M = 0.82, *SD* = 1.25) than the clinical population (M = 2.4 *SD* = 2.1). The results are shown in Table 3 below. Hypothesis 2 was not supported based on these results.

Power analyses were conducted with GPower 3 (Erdfelder et al., 1996), evaluating the *a priori* sample size required to detect a medium-sized effect (*f* = .25; Cohen, 1988) for the group x Total Score interaction. Assuming two-tailed alpha = .05, sufficient power (.99) to detect a large-sized group x Total Score effect (*f* = .90) was achieved with a total sample size of 54, see Figure 3. This indicates that the sample size of 54 was adequate to detect a large sized effect.

Table 3.

Scores for patients compared with clinical norms

	Patients (n = 54)		Clinical Norms (n = 184)	
	Mean	*SD*	*Mean*	*(SD)*
Subscale 1- Negative Mood	1.56**	(1.77)	3.1	(2.3)
Subscale 2- Interpersonal Problems	.64**	(.93)	1.5	(1.6)
Subscale 3- Ineffectiveness	1.08**	(1.44)	2.6	(2.0)
Subscale 4- Anhedonia	3.31*	(2.74)	5.0	(3.4)
Subscale 5- Negative Self-Esteem	.82**	(1.25)	2.4	(2.1)
CDI Total Score	7.46**	(6.46)	14.5	(9.0)

*p < .05, **p <.01

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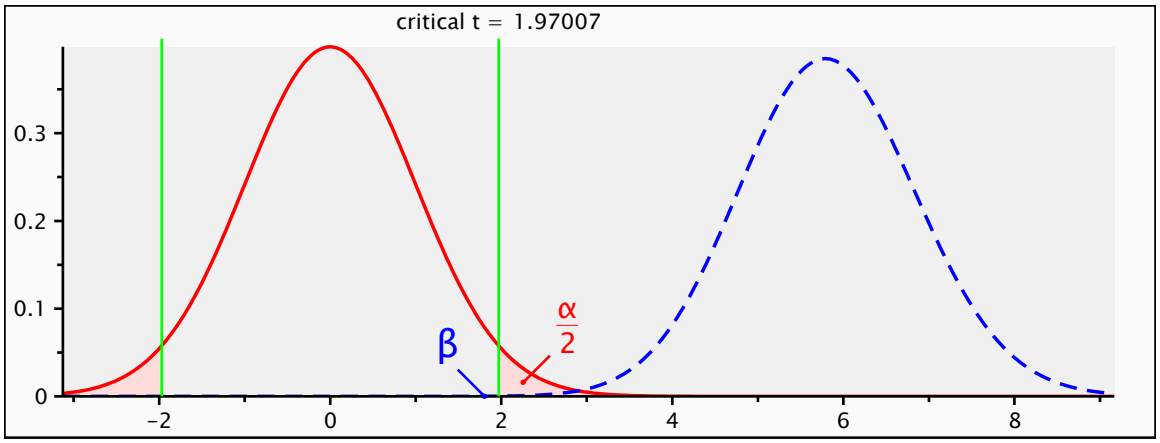

Figure 3. Power analysis for group x Total Score

Aim Two.

To examine the factors which may contribute to depressive symptoms.

Hypothesis 3

It was hypothesized that those children who were hospitalized for a longer amount of time would endorse more depressive symptoms. A multiple regression analysis was conducted to examine length of hospitalization predicting depression severity. Potential covariates of age and gender were included in the model in order to control for their effects when looking for the effects of length of hospitalization. An independent samples t-test yielded a significant effect of gender on the ineffectiveness scale t (37) = -2.27, p = .03. Age did not have a significant correlation with the dependent variables and therefore was not included as a covariate. Regression results indicated that length of hospitalization did not significantly predict any of the scales including: total number of depressive symptoms [R^2 = .014, F (1, 36) = 0.51, p = .48]; negative mood [R^2 = .000, F (1, 36) = 0.007, p = .935]; interpersonal problems [R^2 = .001, F (1, 36) = 0.04, p = .85], anhedonia

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[R^2 = .053, F (1, 36) = 2.03, p = .16]; or negative self-esteem [R^2 = .032, F (1, 36) = 1.18, p = .28]. Ineffectiveness scale was approaching significance in the model, [R^2 = .137, F (2, 35) = 2.79, p = .075]. Length of hospitalization was not a strong predictor of number of depressive symptoms. A summary of regression coefficients is presented in Table 4.

Power analyses were conducted with GPower 3 (Erdfelder et al., 1996), evaluating the *a priori* sample size required to detect a medium-sized effect for the Total Score x length of hospitalization interaction. Assuming two-tailed alpha = .05, power was not sufficient (.14) to detect even a small effect (f = .01). This suggests that the sample size was not large enough to assess the true impact of length of hospitalization.

Table 4.

Regression Analysis Summary for Length of Hospitalization

Variable	*B*	*SEB*	B	R^2
CDI total score				
Number of days hospitalized	.046	.065	.118	.014
Subscale 1- Negative Mood				
Number of days hospitalized	.001	.018	.014	.000
Subscale 2- Interpersonal Problems				
Number of days hospitalized	-.002	.009	-.032	.001
Subscale 3- Ineffectiveness				.137
Number of days hospitalized	.005	.014	.054	
Covariate (gender)	1.177	.505	.383	
Subscale 4- Anhedonia				
Number of days hospitalized	.038	.027	.231	.053
Subscale 5- Negative Self-Esteem				
Number of days hospitalized	.013	.012	.178	.032

*p < .05. **p < .01. ***p < .001.

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Aim Three

To examine participant characteristics associated with endorsement of depressive symptomatology.

Hypothesis 4

It was hypothesized that older children would report greater number of depressive symptoms when compared with younger children. The potential effect of age was assessed by evaluating the correlation between age and the dependent variables (CDI total and subscales). Results indicated that age was significantly related to interpersonal problems, where older patients reported greater amount of interpersonal difficulties (R = 0.297, $p = 0.035$). Age was not significantly related to the other scales. Table 5 includes the correlations among age and the subscales of the CDI, including the CDI total score. Hypothesis 4 was supported based on the Interpersonal problems scale and not the other scales of the CDI.

Table 5.

Correlations with Age

		CDI total	CDI Negative Mood	CDI Interpersonal	CDI Ineffectiveness	CDI Anhedonia	CDI Neg Self esteem
Age	Pearson Correlation	.188	.105	.297*	.243	.112	.042
	Sig. (2-tailed)	.182	.462	.035	.085	.435	.772

*. Correlation is significant at the 0.05 level (2-tailed).

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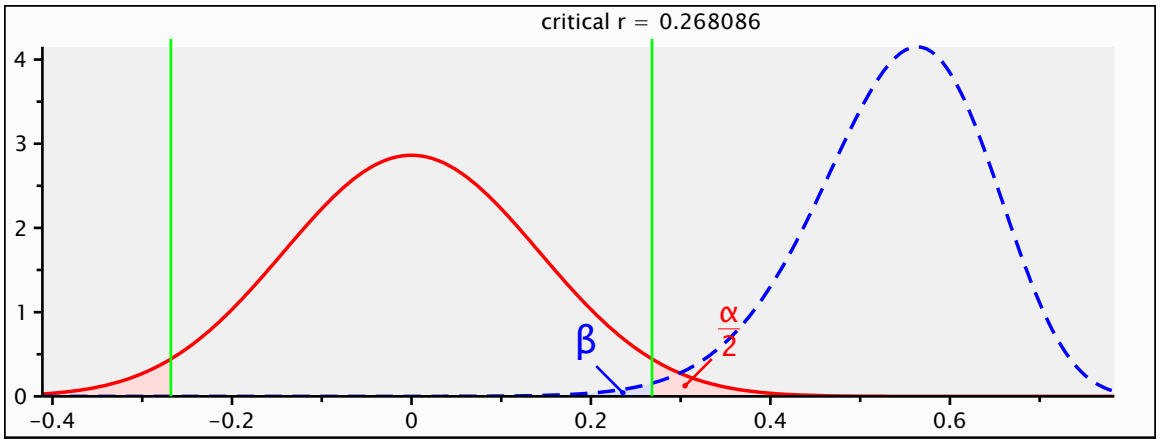

Figure 4. Power Analysis for age x Total Score

Power analysis for this correlation demonstrated that there was sufficient power (.99) to age x Total Score effect with a sample size of 54, assuming two-tailed alpha = .05. See Figure 4 above. This suggests that there was truly no effect of age on any of the scales other than Interpersonal Problems.

Hypothesis 5

It was hypothesized that males will have significantly greater elevation on the Ineffectiveness scale when compared with females. Independent samples t-test was conducted comparing gender across all subscales and the CDI total score. Results yielded that the between-group differences for the two age groups on the Ineffectiveness scale were significant t (49) = 1.98, p = .05. Males (M = 1.56, SD = 1.46) report greater number of depressive symptoms associated with feeling ineffective when compared with females (M = 0.74, SD = 1.41). Surprisingly, boys reported significantly more symptoms [t (49) = 1.98, p < .05] than girls. See Table 6 below for means and standards deviations of the groups across all subscales. Hypothesis 5 was supported based on these results.

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Table 6.

Gender differences for depressions scores

	Males (n = 32)		Females (n = 20)	
	Mean	*SD*	*Mean*	*(SD)*
Subscale 1- Negative Mood	1.88	(2.04)	1.57	(1.80)
Subscale 2- Interpersonal Problems	0.87*	(1.07)	0.32	(0.58)
Subscale 3- Ineffectiveness	1.56*	(1.46)	0.74	(1.41)
Subscale 4- Anhedonia	3.66	(2.85)	3.16	(2.48)
Subscale 5- Negative Self-Esteem	0.94	(1.29)	1.05	(1.39)
CDI Total Score	8.97	(7.01)	7.25	(6.14)

*$p < .05$

Aim 4

To examine how children diagnosed with various medical conditions exhibit depressive symptoms.

Hypothesis 6

It was hypothesized that children with chronic conditions would report greater number of depressive symptoms than children who don't have a chronic condition. An independent sample t-test was conducted comparing chronic and non-chronic conditions across all subscales and the CDI total score. Results yielded that the between-group differences for the two groups were not significant for the CDI total score, t (52) = 1.58, p = .119. However, for the Negative Self-Esteem scale, the difference in the means was significant, t (52) = 2.15, p = .04. There was no significant difference between the groups

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for the other subscales including Negative Mood, t (52) = 1.59, p = .119; Interpersonal Problems, t (52) = 1.61, p = .114; Ineffectiveness, t (52) = 1.84, p = .073; and Anhedonia, t (52) = .904, p = .371. Although not significant, the Ineffectiveness scale was approaching significance. Hypothesis 6 was supported for one of the subscales (Negative Self-Esteem).

Although not significant for all the subscales, the directionality of the data was as predicted. Results indicated that children with a chronic condition were reporting greater number of symptoms associated with negative self-esteem than those with a non-chronic condition. Table 7 includes the means and standard deviations for both groups. A power analysis evaluating the sample size required to detect a medium-sized effect for the group x Total Score interaction was conducted. Results of the power analysis showed that there wasn't sufficient power (.60) for this analysis.

Hypothesis 7

It was hypothesized that children who are hospitalized with a traumatic event would not exhibit greater levels of depressive symptomatology when compared with those children who were hospitalized for a non-trauma related event. An independent samples t-test was conducted comparing trauma and non-trauma related conditions across all subscales and the CDI total score. Results showed that the between-group differences for the two groups was significant for the CDI total score t (49) = -3.07, p = .004. In addition, differences between the groups were also significant for Negative Mood, t (49) = -3.21, p = .002, Anhedonia, t (49) = -2.32, p = .025, and Negative Self-Esteem, t (49) = -2.77, p = .008. These results indicate that children in the trauma group report

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significantly fewer symptoms related to negative mood, anhedonia, negative self-esteem as well as total depression when compared with children who are in the non-trauma group. Table 8 includes the means and standard deviations for both groups.

Table 7.

Chronic patients compared with non chronic patients

	Chronic (n = 22)		Non-chronic (n = 30)	
	Mean	*SD*	*Mean*	*(SD)*
Subscale 1- Negative Mood	2.05	1.81	1.55	2.05
Subscale 2- Interpersonal Problems	0.91	1.02	0.48	0.87
Subscale 3- Ineffectiveness	1.68	1.70	0.93	1.22
Subscale 4- Anhedonia	3.86	2.66	3.17	2.74
Subscale 5- Negative Self-Esteem	1.45*	1.65	0.62	0.86
CDI Total Score	10.00	6.59	7.07	6.57

*p<.05

Table 8.

Trauma compared with non trauma means

	Trauma (n = 23)		Non-trauma (n = 29)	
	Mean	*SD*	*Mean*	*(SD)*
Subscale 1- Negative Mood	0.91**	1.28	2.47	2.13
Subscale 2- Interpersonal Problems	0.48	0.79	0.82	1.06
Subscale 3- Ineffectiveness	0.91	1.00	1.54	1.75
Subscale 4- Anhedonia	2.57*	2.17	4.21	2.90
Subscale 5- Negative Self-Esteem	0.48**	0.73	1.39	1.55
CDI Total Score	5.48**	4.59	10.55	7.27

*p < .05. **p < .01. ***p < .001.

Exploratory Analysis

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An exploratory analysis was conducted in order to look at five groups of medical conditions (tumor, orthopedic injury, congenital conditions, neurological conditions, and other conditions) across the CDI total and subscales scores in order to evaluate trends for various diagnoses. Descriptive statistics revealed there to be 8 subjects in the Tumor group, 16 in the Orthopedic Injury group, 7 in the Congenital Conditions group, 11 in the Neurological Conditions group, and 10 in the "other group" with 2 missing group identification due to lack of available information regarding diagnosis on the patient, see Table 10. The "other" group category included patients with diagnoses such as the following: self inflicted injuries and somatic complaints/ unidentified pain. Univariate ANOVA was conducted to determine the relationship between medical diagnosis and CDI scores. Main effect results revealed that the CDI total score was not significantly different among different diagnostic groups, $F(4, 32) = 1.25$, $p = .312$. For the subscale measures, Negative Self-Esteem subscale on the CDI was significantly different for the five diagnoses $F (4, 32) = 3.49$, $p = 0.018$. See Table 9 for main effects results. Tukey post hoc test was conducted to determine which group was significantly different in number of negative self-esteem related items reported. Results revealed that patients in the tumor diagnosis group had significantly greater number of negative self-esteem symptoms than patients in the orthopedic injury group, $p = .009$. Results also revealed that the tumor group had significantly greater number of negative self-esteem symptoms than the "other" conditions group, $p = .05$. See Table 10 for summary of group means. Diagnostic groups did not differ significantly on any other subscale of the CDI.

Table 9.

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Univariate Analyses of Variance for medical diagnosis

	Medical Diagnosis F^a	F (4, 44)	p
CDI Total	1.13	1.13	.354
Negative Mood	1.11	1.09	.374
Interpersonal Problems	1.24	1.24	.307
Ineffectiveness	1.64	0.71	.591
Anhedonia	1.62	1.62	.182
Negative Self- Esteem	3.14*	3.14	.024

[a]Univariate df = 9, 27; *p < .05.

Table 10.

Mean CDI Score as a Function of Diagnoses

CDI Subscales	Tumor (N = 8)		Ortho. Injury (N = 16)		Congenital (N = 6)		Neurological (N =10)		Other (N =10)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Negative Mood	2.75	2.25	1.19	1.76	1.5	1.38	1.4	1.90	2.22	2.33
Interpersonal Problems	0.75	1.04	0.63	0.89	0.83	0.98	0.1	0.32	1.00	1.32
Ineffectiveness	1.13	1.55	1.31	1.40	2.00	1.26	0.7	1.57	1.22	1.79
Anhedonia	5.38	2.97	2.94	2.43	2.17	2.04	3.2	2.57	3.44	2.92
Neg. Self-Esteem	2.13	1.89	0.38	0.50	1.00	1.26	1.2	1.69	0.56	0.53
CDI Total	12.12	8.15	6.56	5.61	7.50	4.28	6.70	6.91	9.00	7.47

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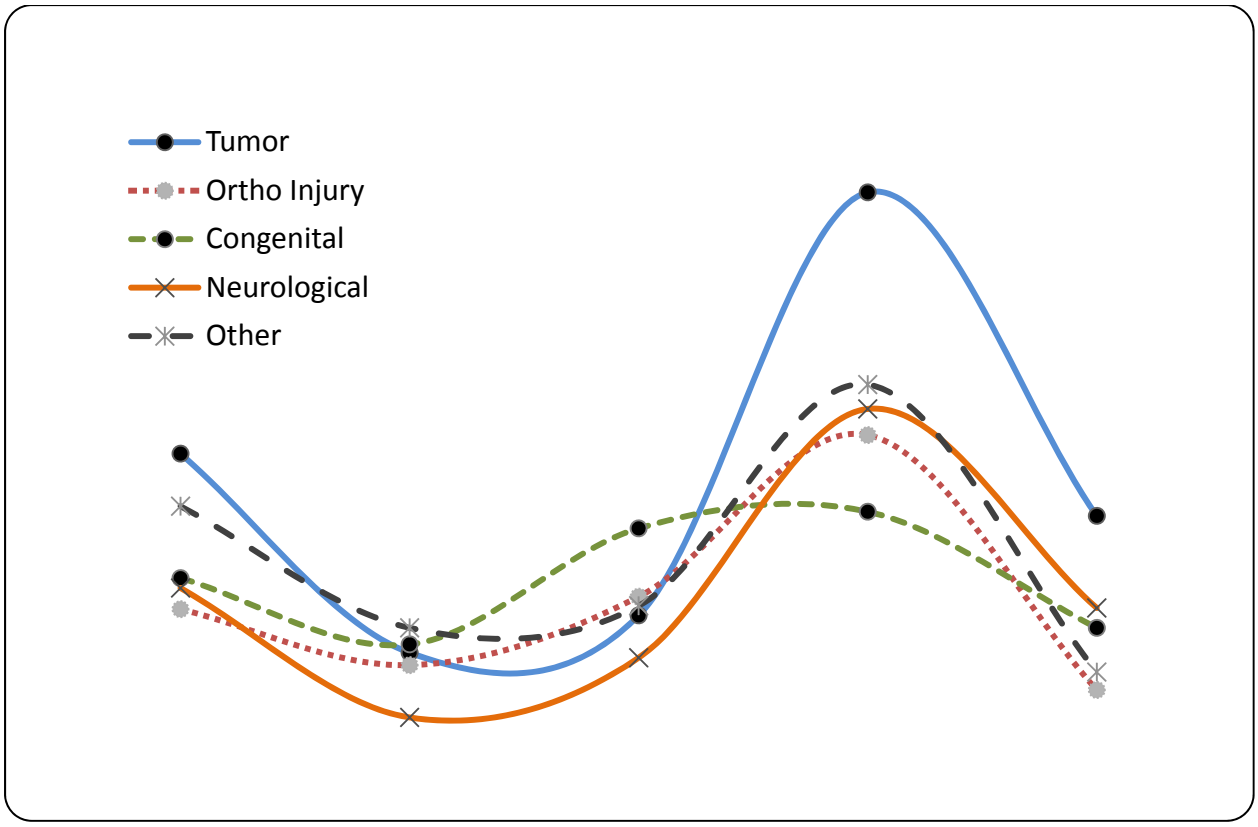

Figure 5. CDI Subscale Scores as a Function of Diagnoses

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CHAPTER FOUR

DISCUSSION

Significance of Findings

Literature has shown that childhood depression is one of the most common mental health concerns. Children with depression are at increased risk for suicide, other psychological disorders, as well as at higher risk of developing psychological conditions in adulthood. Furthermore, stress and environmental factors have been shown to increase the risk of developing depression. One area of research, which has not been looked at closely, is hospitalized children and their risk for developing depression. Given that most investigators have looked at the psychiatric population with regards to hospitalization and depression, those children in acute care for medical treatment have fallen under the radar for how their medical condition, as well as the impact of being hospitalized impacts their emotional functioning. Studies done with this population are outdated and limited to specific medical conditions. A general goal for this study was to evaluate depressive symptoms in the medically ill population. Medically ill children (also referred to as hospitalized children) were compared with normative and clinical comparison groups. Contrary to what was hypothesized, medically ill children endorsed fewer symptoms associated with depression compared to a normative sample of healthy children. Specifically, medically ill children demonstrated significantly fewer depressive symptoms associated with negative mood, ineffectiveness, negative self-esteem, as well as total depression. The trend for interpersonal problems and anhedonia were similar, although not statistically significant, where hospitalized children exhibiting fewer symptoms when compared with published norms of physiologically healthy children.

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Although it was hypothesized that the differences between the groups would have been significant, the directionality of the difference was unexpected, as it was opposite to what was expected. Therefore, this can suggest that children in the hospital are feeling less depressed then healthy children in the community. Given those results, it's not surprising to find that the sample also reported fewer symptoms of depression when compared to a clinical sample from published norms for children who have a diagnosed mood disorder (MDD, Dysthymia, or Adjustment Disorder with depressed mood).

Results such as this raise questions and concerns regarding why this may be. Two questions arise from this. First, given that literature suggests children facing a medical illness are at increased risk for depression, the way in which the items were answered raises questions regarding the measure's validity for this population. Is there a social effect in which these children are not reporting any negative symptoms? A main criticism of the measure is it's face validity which may cause for symptoms to be underreported. It's questioned if the underreporting of symptoms occurred with the sample population. Second, if in fact these results are a valid reflection of what the children are feeling, then reasons why this sample is experiencing less depressive symptoms then in the normative population need to be investigated. Perhaps these children are receiving enough attention and care from others that they are actually coping and adjusting well to their medical illness and hospitalization.

Age, gender and length of hospitalization were considered in this study to impact depression. Results indicated that older children reported greater number of depressive symptoms related to interpersonal problems. For example, older children tended to endorse items such as "I get into fights all of the time", "I never do what I am told" and

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"I am bad many times". This finding is consistent with previous research and with what was expected for this population (Maughan, Rowe1, Messer, & Goodman, 2004). With regards to gender, results were also consistent with what was expected. Males reported significantly greater number of symptoms related to feelings of ineffectiveness compared to females. A surprising finding was that males also reported significantly greater number of symptoms related to interpersonal problems when compared with females. Although the total scores were not different, males reported significantly more symptoms related with interpersonal problems as well as feeling ineffective. This type of difference has important implications for the treatment of disorders. This finding also demonstrates the importance of not taking an all or none approach to diagnosis and attending to individual symptoms individuals endorse. In this study, males and females do not differ in their total number of depressive symptoms, however differed significantly on specific scales. Therefore, examination of subscales provided a broader perspective on diagnosis. Individuals have different pathways to a disorder and the process which takes them there is important.

The third factor, which was predicted to impact depression scores, was length of hospitalization. It was found that length of hospitalization was not a significant predictor of depressive symptoms in this study. These results need to be considered in terms of the limitation of the sample size. Although it was concluded that length of hospitalization had no impact on any of the depression scales or total score, post hoc power analysis demonstrated that there wasn't enough participants in the study to confirm this hypothesis. In fact, given that the model was approaching significance for the

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ineffectiveness scale indicates that it is possible that with more participants, length of hospitalization may have been a predictor of feelings of ineffectiveness.

This study also looked at medical conditions and what it can inform us about how depression is presented. It was found that children with a chronic condition report significantly more symptoms related to negative self-esteem when compared with children with non-chronic conditions. Averages across all areas of depression were higher for the chronically ill group, indicating an overall trend towards greater number of depressive symptoms. These results were as expected and reconfirm that children who are dealing with an ongoing medical condition have greater amount of psychological distress. This study also looked at medical diagnosis in terms of trauma. As predicted, children who were in the hospital due to a condition related to trauma reported significantly fewer overall depression symptoms, in addition to symptoms associated with negative mood, anhedonia, and negative self-esteem. Given that these results are counter intuitive, future research should look into what may be accounting for this presentation.

An important component of this study was the exploratory phase where symptoms endorsed were analyzed across various medical diagnoses. Diagnostic groups considered were tumor, orthopedic injury, congenital conditions, neurological conditions, and other conditions. It was found that in general, the groups did not differ from each other significantly on the different scales. This suggests that different diagnostic groups did not report their symptoms very differently. However, it was found that those with tumor related conditions reported significantly greater number of symptoms related to negative self-esteem when compared to the orthopedic injury group as well as the other category

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group. These results indicated that self-esteem related issues are prominent in children with tumors. Perhaps issues related to body adequacy impacts self-esteem for this group. Graph images indicate that there may be a general consensus and pattern to childhood depression, which is constant across all other factors, include medical diagnosis.

Limitations

Several limitations should be noted and may have contributed to the lack of significant findings in this study. One of the major limitations is the limited sample size. The limited sample size compromised the power of some of the analyses. This indicates that if power was sufficient, then the results would have been more conclusive. Specifically, power was not sufficient for the regression analysis when looking at the length of hospitalization. Power was also not sufficient for the independent samples *t*-test evaluating differences in depressive symptoms in chronic and non-chronic groups.

Another limitation in this study is the sampling procedures. The sample group was a convenience sample of those individuals who were referred for services through the consultation liaison referral source. In addition, the archival nature of this study limited the sample to those who were already administered the inventory. This can create a highly biased sample that is not reflective of all children the hospital setting. In addition, demographic information with regards to cultural background and socio-economic status was not gathered as part of the data collected on the participants. Although it can be said that the medical center services a large minority population, the percentages of who was included in this study is unknown. This is a large limitation

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which significantly limits the possibility of generalizing these findings to a larger population.

The lack of information available on the participants is another major limitation of this study. Because a thorough chart review was not conducted on the patients, other factors, which may be contributing to the current symptom presentation, cannot be considered. For example, this study does not differentiate between children who constantly have family members visiting them and those who are more isolated. Information which can be obtained from a through chart review can add to the credibility of such a study, as it can better control for other factors. Another such limitation of this study is that it did not take into account if the child was on medication. This can impact how findings can be interpreted. In addition to social support and medication, a study also lacks a conformant perspective, such as a parent report. This information would have been helpful for forming greater reliability as well as giving stronger indication if the profiles were valid. Inconsistencies between how the child reported his or her emotional state and what the parents observed would be an interesting point to consider.

Finally, the norms used for this study was also a limitation. Only one set of published norms were used for the comparative analyses. Having other norms to compare the sample to would have increased the studies validity. All of these limitations make the generalizability of the study very narrow if at all possible.

Future Directions

Future studies should include more diverse samples that are representative of the general population, so that pediatric depression can be addressed in broader cultures and

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ethnicities. In addition, due to the limited number of participants, these assumptions should be re-evaluated with a larger sample. Also another addition to future studies to advance research in this area would be to have follow-up evaluation with the participants. Evaluating the trajectory of emotional functioning of these children is an area of gap in research and will add something new to the understanding of pediatric depression. Taking a limitation into consideration, given that social support was not accounted for in this study, future studies can look at the impact of social support as a mediator of mental health. Social support can help differentiate between children who cope well and those who develop more sever symptoms. In addition, depressive symptoms should be assessed multiple times in future studies in order to increase validity as well as evaluate trends of changes in symptoms reported.

Given these results, future studies should look to assess depression in ways which addresses characteristics beyond symptoms. Given that individuals with a medical condition have may physical symptoms which are very similar to items on a depression questionnaires, an approach with separates out those physical component may get to the core of the etiology of depression rather then symptom identification. Future studies can look to different ways depression can be evaluated and validate such approaches in order for it to be useful in treatment planning.

There is an element of philosophical debate when questioning the foundations of how a concept is developed and understood. There is a concern that perhaps the depression measure, being very symptom focused, is not capturing the nature of depression. This would suggest that depression is not accurately identified. Although the CDI is the most widely used assessment tool for childhood depression, when looking at

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individual items on the scale (Appendix A) it becomes clear how flawed this approach can be. First, somatic symptoms are scattered through the measures have statements such as “I sleep pretty well”, “I am tired all the time” and “I eat pretty well” are three examples which fall in the Anhedonia scale. Given that anhedonia is a measure of loss of interest in pleasurable activities, any organic reason can impact the score on this scale without having implications for depression. This may be the reason why the Anhedonia scale was the most elevated in the analyses. Therefore, is anhedonia a core feature of depression or do the items inquire about something that is not clearly related to the construct is questioned. Another concern related with questioning the use of measures such as the CDI is regarding etiology. At an item analysis level, it becomes questionable if the symptom the item is describing is a factor which is causing the depression or vice versa. For example, item 19 states “I never have fun at school”. This item falls on the Anhedonia subscale. On the surface it’s clear why this item would belong on this measure, given that children usually enjoy going to school and it’s a pleasurable activity for them. But for a child who is bullied at school, there may be other reason why school is not enjoyable for them. It is suggested for future studies to challenge this symptom oriented approach at understanding mental health needs.

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APPENDIX A

CHILDREN'S DEPRESSION INVENTORY: LIST OF ITEMS

ACCORDING TO SUBSCALES

Scale 1. Negative Mood

Item 1	I am sad once in a while. I am sad many times. I am sad all the time.
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 8	All bad things are my fault. Many bad things are my fault. Bad things are not usually my fault.
Item 10	I feel like crying everyday. 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 13	I can not make up my mind about things. It is hard to make up my mind about things. I make up my mind about things easily.

Scale 2. Interpersonal Problems

Item 5	I am bad all the time. I am bad many times. I am bad once in a while.
Item 26	I usually do what I am told. I do not do what I am told many 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.

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Scale 3. Ineffectiveness

Item 3	I do most things O.K. I do many things wrong. I do everything wrong.
Item 15	I have to push myself all the time to do my school work. I have to push myself many times to do my school work. Doing schoolwork is not a big problem.
Item 23	My schoolwork is alright. My schoolwork is not as good as before. I do very badly in subjects I use to be good in.
Item 24	I can never be as good as other kids. I can be just as good as other kids if I want to. I am just as good as other kids.

Scale 4. Anhedonia

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

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Scale 5. Negative Self Esteem.

Item 2	Nothing will every work out for me. I am not sure if things will work out for me. Things will work out for me O.K.
Item 7	I hate myself. I do not like myself. I like myself.
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 14	I look O.K. There are some bad things about my looks. I look ugly.
Item 25	Nobody really loves me. I am not sure if anybody loves me. I am sure somebody loves me.

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