The Importance of Managing Adolescent Mental Health
when Diagnosed with Type 1 Diabetes:
A Review of Current Literature
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Abstract

This literature review examines the importance of managing adolescent mental health when being treated for type 1 diabetes mellitus (T1DM). It focuses on adolescence as a time of transition from pediatric to adult care; a time for establishing self-adherence to effective treatment protocol that can determine lifelong outcomes for the patient. Type 1 diabetes is a chronic, life threatening disease with no cure and a rigorous and challenging treatment protocol. It generally onsets in childhood and treatment is administered by caretakers. Ongoing management of the disease is then transferred to the young adult for independent administration. Adherence to protocol is essential for survival and needs to be supported at all stages, but especially during adolescence when routines set precedent for long-term outcomes. There are numerous psychological comorbidities that can exacerbate both the condition and adherence stability including depression, anxiety, eating disorders, adjustment disorder, and bipolar disorder. As effective mental health supports are necessary for sustained physical well being, various educational and therapeutic interventions have been utilized. In the forefront of these modalities are family therapy, multisystemic therapy (MST), cognitive-behavioral therapy (CBT), and problem solving therapy (PST). An Adlerian approach, not currently covered in the literature, is investigated.

Keywords: type 1 diabetes, adolescence, adherence, Adlerian, mental health
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The Importance of Managing Adolescent Mental Health when Diagnosed with Type 1 Diabetes: A Review of Current Literature

Type 1 diabetes mellitus (T1DM), which is also referred to as juvenile diabetes, insulin dependent diabetes, or more formally insulin-dependent diabetes mellitus (IDDM), is a lifelong, life threatening, autoimmune disease that can have serious complications. It requires a rigorous medical protocol to maintain good health (Atkinson, Eisenbarth, & Michels, 2013; Merkel & Wright, 2012), as well as psychological supports to ensure adherence to treatment protocol (Lydon, 2010) and to combat mental health side effects. The disease trajectory is on the rise, affecting large numbers of individuals throughout the world (Barnard, Peyrot, & Holt, 2012; Herold, Vignali, Cooke, & Bluestone, 2013). It is one of, if not the most prevalent childhood diseases (Merkel & Wright, 2012), and a leading cause of death (McEwen et al., 2006). It generally onsets in youth and affects both genders in statistically relevant proportions (Soltesz, Patterson, & Dahlquist, 2007). Current studies estimate there are between 13,000 and 15,000 new cases yearly in the United States alone (King, Berg, Butner, Butler, & Wiebe, 2014; Merkel & Wright, 2012).

In spite of the prevalence of type 1 diabetes, a plethora of new research studies on the topic, and increased treatment options, individuals with type 1 diabetes are not experiencing significantly improved outcomes (Barnard et al., 2012). Despite the availability of new medications and treatment devices, and the emphasis placed on diabetes treatment adherence over the last several decades, National Health and Nutrition Examination Survey (NHANES) data show that 45% of patients with diabetes have not achieved glycemic targets (Center for Disease Control and Prevention, 2013-2014). Outcomes in general are tied to the adherence to
diabetes protocol; that adherence can be an invasive and laborious endeavor. When children are young the dictates of protocol are relegated to parents and professionals. These caregivers manage insulin injections, monitor blood sugar levels and control dietary restrictions ensuring better outcomes. As adults these duties are self-regulated and outcomes are dependent on the level at which each individual administers their protocol.

Managing type I diabetes, and especially keeping blood sugar levels within the normal range, is a struggle for a large number of patients. It can be extremely stressful, with adherence especially problematic during the adolescence transition phase (King et al., 2014). Delamater, Patino-Fernandez, Smith, and Bubb (2010) conducted research regarding stress in children and adolescents with type 1 diabetes and concluded that overall stress is a primary factor in maintaining adequate glycemic control. In a recent study by Freeborn, Dyches, Roper, and Mandleco they reported, “self-care activities, including checking blood glucose and administering insulin were a daily challenge due to pain and inconvenience” (2013, p.1893). These struggles are in part physical and in part psychological. The kind of supports needed for better outcomes must include a psychosocial or psychological approach. Further, many patients have co-occurring mental health conditions like depression (Lloyd, Underwood, Winkley, Nouwen, Hermanss, & Pouwer, 2010), which can interfere with the ability to adhere to needed protocols. The stress produced from always having to monitor blood sugar, watch diet and inject insulin can cause a kind of “diabetes burnout” (Barnard et al., 2012, p. 1358) which the medical and psychological communities are struggling to address.

Although the demands of managing type 1 diabetes are ubiquitously challenging across the age spectrum, it is especially difficult in the years between childhood and adulthood. During adolescence (ages 12-17) and emerging adulthood (ages 18-25) a specific set of challenges
develop and, “emerging adulthood is an especially high-risk period for youth with a chronic illness” (Helgeson et al., 2013, p.270). Lyons (2013) describes this transition as a difficult one and considers recommendations for assessing transition readiness. As parents and caregivers begin to relinquish control of the diabetes protocol, and prior to a time of greater maturity when the patient might manage their routine more independently, there are exigent years that for the purposes of this review will be termed “adolescence” in the broadest sense. These in-between years are of particular significance in the lifespan of diabetes regulation because, “Once established, chronic poor metabolic control tends to persist into adulthood” (Ellis et al., 2012, p. 207). This puts an extra strain on a developmental period when patients are the least equipped to independently follow a difficult health regime. In adolescence, a struggle arises between the physical and the psychosocial needs of the patient with type 1 diabetes, which can be contra-indicators of effective disease control (Freeborn et al., 2014).

Adherence to needed protocol is particularly problematic during adolescence because of the myriad biological, psychological, and social changes that occur during this developmental period (Bonger, Koot, van der Ende, & Verhulst, 2004; Gutman & Eccles, 2007). Characteristically, adolescence is hallmarked by non-conformity and rebellion against authority and established norms, making adherence antithetical to the freedom, individual choice and peer acceptance adolescents require (Cox & Hunt, 2015). “Adolescents with chronic diseases like diabetes face additional and unique challenges when acknowledging or adapting to the disease directly conflicts with the normative tasks of adolescence” (Comeaux & Jaser, 2010, p. 499). Because of the developmental mandates of adolescence, commonsense and conformity can be overridden, creating a deviance from accepted norms and expectations. Adolescents often feel
they are invincible and will knowingly forgo needed treatment and dietary constraints as a part of staking claim to their bourgeoning adulthood.

These post-latency years, during which children transition into young adults, are fraught with irresponsibility regarding necessary practices for good health. Adolescents in general can engage in behaviors that compromise health and eschew what is knowingly good for them. This lack of adherence to protocol when dealing with a chronic, life-threatening disease, such as type 1 diabetes can result in catastrophic consequences. For young people trying to manage their disease, it is crucial that they receive support to succeed in independently handling medical protocol and establishing manageable routines that will be successful throughout adulthood.

The adolescent’s ability or inability to embrace a lifestyle that supports positive diabetes outcomes is of interest to this author and the focus of the following literature review. An exploration ensues regarding the understanding of prevalent psychological and psychosocial factors that define this experience and what specific constructs support its success or failure, i.e. how best to administer mental health in support of adolescents managing their type 1 diabetes.

This review will further examine the question, “What, if any, mental health interventions can help generate success for the adolescent managing type 1 diabetes?” The hope is that an exploration of the literature might produce an understanding of best practices for supporting adolescent mental health in regards to a chronic health condition. Additionally, constructs from Adlerian Psychology that could reinforce successful diabetes management will be reviewed. Finally, results from this literature review will point out areas where further research is needed.

**Background**

Type 1 diabetes is a chronic condition in which the pancreas loses its ability to produce insulin. Since insulin production regulates blood sugar levels, the patient becomes susceptible to
unregulated blood glucose, either too much or too little. The consequences of this unregulated blood sugar can greatly reduce life expectancy and generate dire medical conditions including heart attacks, stroke, kidney failure and blindness (Lydon, 2010).

Description of Type 1 Diabetes

Diabetes mellitus is the general name for a group of chronic metabolic diseases characterized by high blood glucose levels that result from defects in insulin secretion. The two main forms of diabetes are insulin-dependent diabetes mellitus (IDDM) or type 1 diabetes, and noninsulin-dependent or type 2 diabetes. Type 2 diabetes is more commonly diagnosed in adulthood and is characterized by the body’s inability to use insulin properly. Although type 1 diabetes can be diagnosed in adulthood, it is most commonly diagnosed in childhood or adolescence (American Diabetes Association, 2014).

Type 1 diabetes occurs when the beta cells of the pancreas are destroyed by the immune system and can no longer regulate blood sugar through the proper production of insulin. The pancreas is an endocrine (hormone producing) organ made up of little islands of cells, called the islets of Langerhans which sense blood sugar levels and produce insulin to maintain proper levels. In type 1 diabetes, the abnormal autoimmune response destroys these Islets of Langerhans cells leaving the individual incapable of proper blood sugar regulation. The body’s ability to produce insulin becomes progressively impaired until eventually no insulin is produced at all. This lack of insulin production creates guaranteed morbidity if untreated (American Diabetes Association, 2014).

For the patient with type 1 diabetes the challenge becomes monitoring blood sugar levels and providing enough supplemental insulin to keep the body regulated. This sounds simple enough, but the regimen is protracted and demanding: it encompasses a lifelong dependence on
medication, strict dietary and exercise guidelines, careful blood sugar monitoring, and a prescribed lifestyle that is not necessarily easy for the patient to assimilate (Freeborn et al., 2013.)

The consequences of poorly managed diabetes exist on both a short-term and long-term bias (Gubitosi-Klug, 2014: Hood, Peterson, Rohan, & Drotar, 2009). In the short-term, when blood sugar levels are not balanced, patients run the risk of developing two potentially serious complications that can occur at either end of the blood sugar spectrum. First, too little sugar in the system, or hypoglycemia, and second, too much sugar in the blood, or hyperglycemia.

In type 1 diabetes patient’s hypoglycemia generally results from injecting too much insulin relative to blood sugar level. The predisposition for this discrepancy can be affected by; physical activity, insufficient carbohydrate intake, improper testing of blood sugar levels prior to insulin injection, or a combination of all three. The symptoms can include tremor, palpitations, agitation, weakness, confusion and seizures (Fowler, 2009). If left untreated hypoglycemia can cause irreversible brain damage or death (Barnard, Thomas, Royle, Noyes, & Waugh, 2010).

Conversely, extreme hyperglycemia can result from too little insulin. Again this can occur from a less than ideal amount of insulin ingested relative to blood sugar levels, a lack of, or excess of, physical activity, surplus carbohydrate intake, or a combination of these factors. There exists a very delicate balance between optimal blood sugar levels and insulin, something that the body is naturally designed to regulate, but in the case of type 1 diabetes no longer has the ability. When poor regulation results in extreme hyperglycemia, it can further develop into diabetic ketoacidosis, a disorder where the body abnormally breaks down fat, infusing high levels of blood acids called ketones into the system. This creates a toxic response with
symptoms that can include excessive urination, dehydration, vomiting and hyperventilation, and if untreated can result in coma or death (Inzucchi & Sherwin 2009).

If type 1 diabetes is not managed properly in the long-term, that is, a decade or more, it can cause additional severe complications. It can affect any number of vital organs resulting in additional chronic diseases. Common outcomes of poorly managed type 1 diabetes can include arteriosclerosis, blindness, nervous system disorders, renal failure and various complications in the legs, including pain, cramping, neuropathy- and even the necessity for limb amputation (World Health Organization, 2015).

History

Although considered a rare condition, Type 1 diabetes was described as far back as the Egyptians (Polonsky, 2012). It was characterized by an emptying of the urine (frequent urination), and urine that attracted ants or “honey urine,” the consequence of too much sugar leaving the system. This term “honey urine,” was coined circa 6BCE by a Hindu physician named Sushrata. The Greeks went on to name the condition diabetes mellitus, again in relation to the sweetness of the urine (Kaplish, 2013).

In western medicine, the diabetic condition was first tested in 1776 by an English physician Matthew Dobson. He measured glucose in the urine of patients and determined that with diabetes there was a higher than normal amount. From that point on diabetes was recognized and described as a part of the medical literature, becoming a clinical entity in the early 1800’s (Polonsky, 2012). A diet free from sugar and simple carbohydrates was the only known treatment and could extend life for several years, but prognosis for diabetic patients was death.
It was not until the early 1900’s that medical advances began to undertake a more comprehensive understanding and treatment of the disease. In 1916, Elliott Joslin, MD developed and published the first treatment protocol for type 1 diabetes (American Diabetes Association, 2014; Rosenfeld, 2013). In 1923, two physicians working at the University of Toronto, Banting and Macleod, were awarded the Nobel Prize for their discoveries with insulin (a hormone derived from the pancreas) which was extracted from animals. Their research proved a correlation between lowered blood sugar in research animals and the injection of insulin. In that same year, Eli Lilly began the manufacture of insulin to be used with human patients. In 1940, the American Diabetes Association was founded, and in 1950, along with the U.S. Public Health Service, the Association developed dietary guidelines for the disease that could be used in addition to the established protocol of insulin for blood sugar regulation (American Diabetes Association).

In ensuing decades, research continued regarding cause, treatment, and potential cures for diabetes. By the 1980’s it was clearly understood as an autoimmune disease and research undertook to better ascertain the factors involved in its’ pathogenesis (Polonsky, 2012; Herold, Vignali, Cooke & Bluestone, 2013). Alongside an understanding of causation, professionals were concerned with the effectiveness of the treatment protocol in maintaining the condition. Properly combined insulin, diet, and exercise could produce more optimal blood sugar levels and effectively treat diabetes while science worked to produce a cure, but patients were struggling with the difficulty of the protocol. Easier insulin administration tools, more effective blood sugar monitoring methods, and further knowledge about nutrition became the focus of research (Comeaux & Jaser, 2010).
By the 1990’s the increased prevalence and less than optimal outcomes generated interest in more education, and eventually psychosocial supports, for type 1 diabetes patients. The difficulty with adherence to protocol was significantly linked to outcomes and opened up a new area of need in effectively treating type 1 diabetes (Freeborn, Dyches, Roper, & Mandleco, 2013). As a psychosocial approach to treatment began to take hold, both effects of managing the disease, diabetes “burn out” (Barnard, Peyrot, & Holt, 2012), along with understanding and treatment of various common comorbidities, became part of a more holistically focused treatment of the disorder. There is not yet a cure for type 1 diabetes, but research continues.

Summary

Type 1 diabetes is a chronic insulin dependent disease with life threatening consequences if not properly managed. Type 1 diabetes has been an enduring human disease since the time of the Egyptian and Greek civilizations, with major medical advances occurring in the last two centuries. It most often presents in childhood and patient lifespan is dependent on adherence to treatment protocol. Adolescence is pivotal in establishing independent and ongoing maintenance of the treatment. Education and psychological supports are necessary to ensure successful adherence to the medical protocol. Treatment regimens are arduous and a cure still outstanding.

Treatment Challenges and Considerations

In treating type 1 diabetes, there are both physical and psychological considerations which are not mutually exclusive. They overlap and interweave, and addressing one aspect without addressing the other is tantamount to prescribing poor treatment and insuring poor outcomes. Type 1 diabetes is equally as much a psychological challenge to the patient as it is a physical one. In understanding an effective overall treatment protocol, there are two areas that need addressing (Lydon, 2010).
Physical Challenges

The first area, physical treatment of the disease, is challenging because of its rigor and often the need for secondary support. The treatment routine is labor intensive, but mandatory for treatment success. The patient is required to control blood glucose, monitor food intake, check blood glucose levels and administer insulin (Freeborn et al., 2013). These constructs often require the support of friends, family members and professionals.

The major challenge to physical treatment success is adherence. Adherence has been described as “the extent to which a person’s behaviour – taking medication, following a diet, and/or executing lifestyle changes – corresponds with agreed recommendations from a health care provider” (World Health Organization, 2003, p.17). The administration of insulin to regulate blood sugar and manage type 1 diabetes sounds simple enough, but in actuality it is a complicated and arduous process. Management of the disease requires adherence to a multifaceted daily regimen involving insulin administration, blood glucose checks, adjustment of insulin dosage, and regulation of diet and exercise to maintain optimal blood sugar levels (American Diabetes Association, 2011). The type 1 diabetes regimen involves a number of ongoing steps, as recommended by the American Diabetes Association (2014), and there is no break from the routine and very little room for error.

**Insulin.** The administration of insulin is necessary multiple times per day. This can occur through injection, or in place of injections a continuous infusion pump can be utilized by the patient. The administration of insulin to regulate blood sugar and manage type 1 diabetes sounds simple enough but, in actuality, it is a complicated and arduous process.

**Blood sugar monitoring.** Patients must also measure blood sugar levels by pricking their fingers and testing levels on numerous (six or more) occasions each day. This routine is
overseen by a parent or caretaker in childhood and transferred to the young adult to manage as the child ages.

**Diet.** The diet for type 1 diabetes emphasizes healthy eating. It recommends little to no sugar and limited carbohydrates and alcohol. It must be balanced with a constant attention to intake of protein and carbohydrates.

**Exercise.** Exercise can affect blood sugar levels and needs to be monitored. Either too little exercise or too intense a workout can cause changes in blood sugar levels that need to be assessed on an ongoing basis.

**HbA1c.** Control of Type 1 diabetes is monitored in an overall fashion by assessing HbA1c. This term refers to glycated haemoglobin which is a product of red blood cells interacting with glucose, and their measurement gives physicians an indication of overall, longer-range - health in relation to the handling of diabetes. Patients must be tested for overall blood glucose interaction at regularly scheduled office visits throughout the year.

**Physical assistance.** In addition, some patients need physical assistance in the form of an actual person available to support various aspects of treatment success. Freeborn et al, (2013) described numerous examples in their study of youth with type 1 diabetes, including an eight year old needing physical assistance getting to the nurses office when challenged with low blood sugar, an 11-year old whose family members, including siblings, were taught to test blood sugar levels on their diabetic family member in the event of fainting or extreme weakness, and a 13-year old whose close friend was enlisted to help with understanding protocol and interventions in the event of low blood sugar.

Managing the physical rigors of testing, insulin administration, diet and exercise, as well as having support in the form of an informed support team of individuals comprise the major
considerations regarding treatment for type 1 diabetes. These factors need to be administered and structured in a manageable fashion on a daily bias for patient success with the disease. A routine that supports adherence to protocol and support from individuals with possible complications must be in place at all times and can cause numerous physical challenges for the patient. These necessities can also lead to pronounced psychological trials.

**Psychological Challenges**

Psychological factors, the second area of treatment challenge, determine how rigorously the patient is able to follow needed physical guidelines and protocols and thus achieve treatment success. The routine, in and of itself, has been described by patients as causing stress and challenges with psychological functioning (Dolan & Hood, 2013). Stress has been described as “An experience (objective or subjective) that diminishes the psychological and physical resources of the person” (Delamater et al., 2013, p. 50). This potentially diminished functioning, and the various psychological factors and comorbidities that can result, are beyond the purview of the biomedical model alone and require both education and counseling (psychosocial) interventions with the patient.

From the time of onset of the disease the need for psychological supports is evident. However, since lifelong establishment of effective protocol adherence is independently instituted during adolescence, the time of young adulthood becomes especially critical for learning to manage the psychological challenges of treatment that could undermine the establishment of good adherence practices.

What can hinder this process is a combination of factors that affect young adults in general and needs to be considered as part of adolescent diabetes treatment. Williams, Sharpe, and Mullan (2014) conducted research on the typical developmental challenges of adolescence.
and concluded that the stress of a major illness did in fact greatly exacerbate the normal developmental tasks with consequences to protocol management in the type 1 diabetes patient. In a study by Freeborn et al. (2013) they further supported this idea and went on to specify areas that arose as primary stressors including managing “(1) low blood glucose; (2) self-care activities; and (3) feeling different and/or alone.”

Type 1 diabetes (T1D) is often labeled a ‘‘family disease’’ (Williams, Laffel, & Hood, 2009), in part because of the significant role that parents play in treatment management, but additionally because of the relationship between family support and patient adjustment. Again, Freeborn, et al. in their article Identifying Challenges of Living with Type One Diabetes, found having physical support, as in a person to help nearby, was integral in a patient’s perception of managing effective protocol. Parental adjustment and attitude (Moreira, Frontini, Bullinger, & Canavarro, 2014) along with parental involvement (King et al., 2014) are significant determinants of positive long-term outcomes.

Unfortunately the developmental tasks of the adolescent can be in direct opposition to treatment protocol adherence and in direct opposition to parental support. Family cohesion plays a significant role in limiting the challenges adolescents face in assuming responsibility for their diabetes care (Moreira, Frontini, Bullinger, & Canavarro, 2014). Other developmental tasks can present in opposition to good self-care as well. Due to the conflict between need the for support in managing blood sugar and the desire for independence, the stages of ego identification and role confusion as described by Erik Erickson (1959), are major hurdles for the adolescent with type 1 diabetes.

A secondary area of challenge in treating this disease is the comorbid mental health conditions that often occur. Issues can arise both in relation to the disease, and, as a likely part
of adolescent development. When two conditions are present together, for example diabetes and depression, there is an even greater risk of mental health trials regarding adherence. Along with the diabetes “burn-out,” that can occur, depression and/or anxiety, as well as disorders like Bipolar Disorder, are challenges faced by the patient with type 1 diabetes. Eating disorders are also common, particularly with girls, and can be triggered by needing to constantly monitor the specifics of food intake (Weaver, 2012).

**Adolescent Development**

Adolescence can be an especially difficult time but even more so with the addition of a chronic and life threatening disease such as type 1 diabetes (Colombini & Schivalocchi, 2013). Adolescence is a period of developing independence, learning from trial and error, and rebelling from societal and family norms (Schmidt, 2013) and has been studied in depth starting with the seminal works of G. Stanley Hall in the early 1900’s (1904). As teens work on becoming more self-sufficient, they naturally distance themselves from their parents and work at gaining independence. This becomes the usual time for patients with type 1 diabetes to transition into self-care of their medical protocol and take over responsibility for maintaining their health.

The literature supports the need to understand basics of adolescent development as a backdrop to better comprehending the challenges young people with type 1 diabetes face. There are two varying schools of thought about the developing adolescent, one predicated on a brain chemistry approach and the other an experiential model. Both sides concede that there are significant changes to the brain during adolescence, but one would maintain that teens are hardwired for risk (Kelly, 2012), while the other lends more credence to a lack of experience and environmental factors as underlying irresponsibility (Bessant, 2008). This thinking evolved out of the split between a strictly biomedical model of the human versus a psychological model of
understanding that developed into the social sciences; the nature versus nurture controversy has played out in regards to what underlies adolescent behavior.

On the biomedical brain chemistry side of the argument, Bates (2014) in her review of *Adolescent Brain Development: Implications for Behavior* by Jetha and Segalowitz, points out that there is an irrefutable correlate between physical changes in the brain and adolescent behavior. Roaten and Roaten (2012) elaborate on the influences that brain chemistry have on behavior via altered cognition and emotion, and further support the notion that adolescent behavior is derivative of changes in the brain. There is a plethora of literature supporting this side of the argument (Blakemore, 2006; Schwartz, 2008; Willoughby, Good, Adachi, Hamza, & Tavernier, 2013).

On the other side of this argument the social sciences supported a further understanding of adolescent behavior and focused on understanding the psychological needs and stages of the adolescent. Using the seminal model proposed by Erik Erickson in the 1950’s, we can understand there are two major areas of developmental tasks to be completed by the adolescent and young adult that are likely affected by both brain chemistry and environment; first that of ego identity and role definition, and second that of intimacy versus isolation (Erickson, 1959).

In the ego identity and role confusion stage, the adolescent is challenged to figure out who they are and what their function will be. They naturally experiment with different roles and eschew that of the norm in an attempt to better understand who they are (Erickson, 1968). However, the patient with diabetes does not have the luxury of challenging their existing role as patient, or to experiment with adherence to protocol in a trial and error manner. With type 1 diabetes, a part of the adolescents’ role is already prescribed for them, causing role conflict and a perceived lack of choice and independence.
In the second stage of intimacy versus isolation (Erickson, 1959), the young person is driven to be part of the group. This can be difficult when their disease naturally sets them apart, causing feelings of isolation. They may choose to forgo needed protocol in favor of inclusion in adolescent group norms such as drug and alcohol consumption, and may push biological limits with lack of sleep or intense exercise, all of which are antithetical to good diabetes care. The dilemma of adherence to established norms, versus inclusion in the emerging social group, is a primary conflict for the adolescent with or without a life-threatening disease.

Cognitive development continues throughout these stages as well and sets a precedent for the ways in which learning takes place. For example, “Early adolescents are generally more responsive if information is presented in small pieces instead of larger blocks” (Meschke, Peter, & Bartholomae, 2011, p.94). These kinds of considerations are important in designing both effective education and psychological or psychosocial supports for adolescents.

Psychiatric Comorbidity

In addition to the aforementioned challenges that come with a normal maturation process, there are numerous comorbidities that can occur with type 1 diabetes that often establish themselves in adolescence. In a 2011 study by Butwicka, Fendler, Zalepa, Mlynarski, and Gmitrowicz, 48% of the diabetic children who were monitored developed some sort of psychiatric comorbidity. In a 2014 study of 629 diabetic children by Stahl-Pehe et al., they found a less significant percentage, but did observe that the patients with mental health comorbidities related their quality of life (QoL) as dramatically lower than diabetic peers without a comorbidity. They also stressed the importance of mental health screenings with this population. When the patient begins to take responsibility for their treatment, a number of psychological disorders (which may or may not have developed in the absence of type 1
diabetes) become prevalent. These include depression, anxiety, adjustment disorder, bipolar, eating disorders, identity issues and a term originally coined by Erving Goffman (1963), *Stigma*, many of which can exist simultaneously.

All of the previous can exacerbate the challenges of adherence to protocol and often result in lowered outcomes, multiple complications and hospitalizations (Maskey et al., 2013). The research is newly emerging and many of the lesser areas of comorbidity remain relatively neglected in the research (Lydon, 2010). However, the presence of a psychiatric comorbidity is considered a good indicator of acute incidents that will occur, especially with adolescents (Butwicka, Fendler, Zalepa, Mlynarski, & Gmitrowicz, 2011). Further, the type of psychiatric disorder, and the level of severity, factor heavily into the patient’s ability to stay adherent to treatment regimens (Kerr et al., 2007).

**Depression.** Diabetes and depression are increasingly associated, and especially concerning in younger populations (Massengale, 2005). Depression rates in patients with diabetes are twice that of the non-diabetic population and consistently linked to poor self-management of the disease (Hermanns, 2010). Depression in general undermines the ability to effectively manage life tasks and with diabetes there is no latitude to let needed self-care lapse. In the adolescent population, depression is an issue even without the presence of diabetes, but the rates can increase when the disease is present (Corathers et al., 2013). Recently researchers undertook a comprehensive review of the current literature on the incidence of depression with young adults having a diagnosis of type 1 diabetes (Johnson, Eiser, Young, Brierley, & Heller, 2013). Although they considered their research non-conclusive in relation to increased incidence of depression in adolescents with type 1 diabetes versus their typical peers, they did conclude that incidence of depression with diabetic patients is associated with lowered diabetes outcomes.
or higher HbA1c. Depression is also linked with higher risk of developing diabetes (generally type 2 in non-diabetic patients) (Hermanns, 2010).

Anxiety. It is difficult to separate depression and anxiety as they often co-occur and occur at a similar rate. Maia et al. (2014) found a rate of co-occurring depression to be 53.6% and anxiety to 60% with type 1 diabetes. Researchers consistently site anxiety, with or without depression, as a comorbidity of diabetes with numerous ongoing concerns experienced by the patients (Ducat, Philipson, & Anderson, 2014). Patients can experience anxiety over monitoring blood sugar levels, food consumption, and exercise which represents essentially all aspects of treatment protocol which need to be managed multiple times per day. There is anxiety (for the adolescent in particular) regarding extracurricular involvement: sports at school, recreational activities, food and alcohol consumption. There is anxiety about body image and weight, particularly being too thin. There is anxiety about being different, fitting in, doing a “good job” of managing protocol, and becoming depressed, just to name a few (Ducat, Philipson, & Anderson, 2014).

Adjustment disorder. Adjustment disorder is characterized by an intense emotional or behavioral response to a specific life event that results in disturbance of conduct, and/or various emotional symptoms (Bronisch & Heidemarie, 1989). It can be acute or chronic and is often accompanied by depression and anxiety. It is however, differentiated from depression by severity of symptoms and recovery time (Bronisch & Heidemarie, 1989). This differentiation can be difficult to ascertain but is important for long-term treatment. Adjustment disorder is less likely to include personality disorders than is depression.

Adjustment disorder is a “stress-related, short-term, nonpsychotic disturbance. The discomfort, distress, turmoil, and anguish to the patient are significant, and the consequences (eg,
suicidal potential) are extremely important” (Frank, 2014, p. 1). In a study by Kovacs, Ho, and Pollock (1995) approximately one third of the youth surveyed developed an adjustment disorder after being diagnosed with type 1 diabetes. They also concluded that a diagnosis of adjustment disorder was indicative of later psychopathology, although not as likely as with depressive disorder (Doherty, Jabbar, Kelly, & Casey, 2014).

**Bipolar disorder.** In an interesting twist on comorbidity, several research studies indicate that with a primary diagnosis of bipolar disorder, diabetes, although more commonly type 2, can be a comorbid occurrence of the psychiatric disorder. One study by Ruzichova, Slaney, Garnham, and Alda (2003) found a possible genetic link between Bipolar Disorder and diabetes. Schoepf and Heun (2014) studied hospital death rates with bipolar disorder and various comorbidities. They cited diabetes and diabetes related complications as primary comorbidities and associated them with a higher number of in-hospital deaths. Other studies looked at how best to pharmaceutically treat bipolar in a patient with type 1 diabetes (DelBello, Correll, Carlson, Carlson, & Kratochvil, 2007).

**Eating disorders.** Of all the comorbidities associated with type 1 diabetes, eating disorders rank among the most prevalent and the literature on the subject is ample. The presence of an eating disorder increases the risk of health complications because of a lack of adherence to treatment protocols, especially in adolescents (Davidson, 2014). A comorbid eating disorder appears to be more common with women, across the age spectrum, than with their male counterparts (Balfe et al., 2013; Martyn-Nemeth, Quinn, Hacker, Park, & Kujath, 2014). Outcomes for this group were greatly reduced, motivation to adhere to treatment lesser and insulin abuse problematic (Custal, et al., 2014). Overall individuals with type 1 diabetes are at greater risk of developing an eating disorder that the general population (Weaver, 2012). In the
adolescent population, where eating disorders are more prevalent, the research indicates a less significant difference in the number of patients with type one diabetes and an eating disorder from their non-diabetic peers (Baechle et. al., 2014).

Identity issues. Goldman and Maclean (1998) conducted one of the first qualitative research studies specifically on identity and diabetes. In analyzing the narrative responses of the participants, significant identity issues arose underlying the understanding and management of diabetes. Findings were in line with accepted theory of identity negotiation that understands behavior as guided by identity (Swann & Bosson, 2008).

In Lydon’s 2010 research regarding psychological factors impacting diabetes treatment, they found identity issues to be one of two primary elements of psychological dissonance. Research subjects described conflicts between treatment recommendations and the ability to pursue desired identity. Especially with the young adult population the desire to participate in normal activities often superseded adherence and compromised diabetes treatment.

Stigma. Irving Goffman (1959, 1963) wrote about the judgment and rejection experienced by individuals with a significant difference from the norm and the psychological and social repercussions to sense of self. The stigmatization of having a disability or disease often results in an altered social experience that can cause stress and trauma, and greatly affect one’s perception of self. Lydon (2010) found stigma, along with the previously mentioned identity issues, to be primary factors that impacted treatment adherence with diabetes patients. He further concluded that the experience of stigma, for being labeled with the disease; using testing equipment, having to administer insulin and restrict diet, was the most pervasive and identified stressor mentioned by his research subjects. The experience of being stigmatized resulted in increased additional comorbidities like depression and anxiety.
Summary

The challenges of treating patients with type 1 diabetes are two-fold. First, there is the arduous routine of maintaining the physical treatment protocol and having an informed support team of family and friends in place for needed help. Second, there are the psychological repercussions and comorbidities related to having the disease. Adolescents in particular struggle due to natural developmental obligations and the challenges of comorbidities such as anxiety, depression, adjustment disorder, bipolar disorder, eating disorders, identity issues and stigma. Outcomes for type 1 diabetes are dependent on adherence to treatment protocol which is greatly influenced by psychological health.

Managing Mental Health / Education and Therapeutic Interventions

How best to manage the mental health concerns of patients with type 1 diabetes is a primary concern of professionals working with this population. The research is broad regarding the topic with interventions encompassing a wide range of modalities. The medical community and the American Diabetes Association, have added recommendations for educational curriculum and therapeutic interventions to overall treatment protocol as a better understanding of the correlation between mental health and physical health has advanced (Harris & Lustman, 1998).

For centuries the established biomedical model viewed mental and physical health as mutually exclusive. Building on the work of Rene Descartes (1596-1650) and his theory that the mind and body were separate entities (Descartes, 1993), the medical community sought to treat physical illness through a strictly physical/biomedical approach. In the late 1870’s psychology broke away from the overall study of philosophy and carved an in tandem, if still fairly separate, path to supporting individual health. As the discipline developed, many strides were made in the
care and treatment of the mentally ill and eventually mental health was considered in relation to physical disease in an effort to create overall well-being. In recent decades, the desire to ensure better outcomes for diabetes patients, particularly adolescents, has led to the inclusion of numerous psychosocial and psychological treatment approaches and an evolving array of nonmedical interventions for supporting physical health (Gonder-Frederick, Cox, & Ritterband, 2002). Lydon (2010) concluded that, “due to the biomedical model’s explanatory focus, it cannot address behavioral issues impacting adherence” (p. 175) and thus the need for diabetes support from the social sciences.

Just prior to the turn of the millennium, Harris and Lustman (1998) set about establishing the importance of psychological treatment. They created overall objectives for diabetic patients that focused on psychosocial constructs. Their recommendations included:

- “To improve adherence to the diabetes treatment regime.
- To promote pro-diabetic coping behaviors (e.g. diet and exercise).
- To extinguish high-risk health behaviors (e.g. smoking, high fat intake).
- To improve family functioning as it relates to communication and problem-solving about diabetes.
- To provide support for subclinical distress related to diabetes” (p. 609).
- And, for patients with diagnosed psychological distress, “To evaluate and treat psychopathology, particularly depression, anxiety, and eating disorders. To refer for psychoactive medication as needed” (p. 609).

Harris and Lustman (1998) further discussed criteria for the selection of good mental health providers for this population. They stressed that clinical psychologists be trained in “reinforcement strategies, learning principals, and behavior modification” (p. 610). They further
recommended the inclusion of medical social workers in a team approach for access to community resources and expertise in case management.

In the ensuing decade Harris, with research associates as well as singularly (2001, 2006) continued to research family therapy and family involvement with adolescent diabetes patients and stressed the clinical significance of family participation. In their 2001 study, they followed 119 adolescents and their parents who either participated in behavioral family systems therapy, educational support, or no treatment. All individuals (adolescents, mothers and fathers) in the two intervention groups showed various degrees of improvement versus the control group with no intervention. Their findings were corroborated in an inverse way in a recent study by King, Berg, Butner, and Butler (2014) whose research results established a correlation between decreased parental involvement in diabetes treatment during adolescence and “predicted declines in adherence across adolescence” (p. 429). These results are significant, as decreased adherence is indicative of “increased risk for a variety of mental health problems” (p. 429) along with greater health risks.

In general, it is now a well-established concept that psychosocial factors have a profound impact on adherence (Lydon, 2010) creating the necessity for psychological supports in achieving overall health with the diabetes patient. At present the literature identifies numerous approaches to supporting mental health with an emphasis on intervention during the adolescent years. These areas include: education, including self-care and dietary awareness; psychosocial factors, including family involvement, parental persuasive strategies, multisystemic therapy (MST), and further team approaches such as diabetes support groups; and psychological approaches with interventions including mentoring and person supports and behavior modification approaches such as cognitive-behavioral therapy (CBT) and problem solving.
therapy (PST). Other approaches like dialectical behavioral therapy (DBT) and psychotherapy can be used to treat the various co-morbidities that occur with type 1 diabetes, and deliberations about dissemination of information, i.e., the efficacy of online support versus in person support are considerations.

**Education**

Education was perhaps the first form of support beyond strictly medical intervention that was instituted with diabetes patients (Mazzuca et al., 1986). As of 2012 those (diabetes) educators were still primarily nurses and dietitians (Martin, Warren, & Lipman, 2013) but research into the feasibility of incorporating lay educators to expand availability and reduce cost is being explored (Mandalia, Stone, Davies, Khunti, & Carey, 2014). Knowing what to do and how to better understanding the disease, was seen as a way to give patients self-assurance and generate better adherence and better outcomes.

Education has focused in two primary areas, self-care and diet, although these categories are not mutually exclusive. The International Society for Pediatric and Adolescent Diabetes 2014 guidelines strongly recommends a structured educational program for both children and young adults (Chaney, 2012; Lange, Swift, Pankowska, & Danne, 2014). These programs are also considered effective in educating professionals, from doctors and nurses to psychologists, and can be used beyond the spectrum of patient need.

**Self-care.** Self-care or self-management with diabetes involves the ability to knowledgeably test blood sugar, administer insulin, and respond to the effects of lowered glucose. Education to provide proficiency in these areas is especially important for the adolescent taking over from parents and professionals, and transitioning to full self-care. In a 2014 study by Snow, Sandall, and Humphrey, they determined that the first course of action for
successful self-care was to have the patient set realistic goals, especially in regards to HbA1c targets. Grant et al. (2013) proposed a structured educational program to include core curricula including carbohydrate counting, insulin adjustment, low blood sugar management, group work, goal setting and empowerment techniques. Ellis et al. conducted a meta-analysis in 2004 of educational programs from the previous decade, 1990-2000. They identified three areas that seemed to create the greatest overall effect on glycemic control. These included some kind of face-to-face delivery of the education, techniques that helped with cognitive reframing of the experience, and exercise content. Again, the goal of self-care education is to empower the patient regarding protocol and ensure better outcomes.

Diet. The American Diabetes Association, along with the International Society of Pediatric and Adolescent Diabetes, have specific guidelines for diet with type 1 diabetes patients. These were updated in 2013 by the American Diabetes Association, with more attention to cultural orientations to food. Guidelines have remained roughly the same over time with patients who are encouraged to count carbohydrates so as not to spike blood sugar and to eat a nutrient rich diet free from refined sugars and high fats. Specifics on maintaining a diabetic friendly diet has been incorporated into educational programming and the importance of patient adherence to guidelines stressed as part of patient care. In 2011, Long conducted a review of the current literature regarding dietary education specifically for adolescents with type 1 diabetes. An attempt to determine educational needs was the research focus with conclusions indicating limited literature on the topic. The basic needs of calorie counting and education that dispelled eating myths were concluded as primary needs for adolescents. In 2008, Papanas and Maltezos looked at the importance of accurate dietary education in creating greater freedom for patients. There have been misconceptions on the part of patients that a diabetic diet must be very strict,
but in fact research is finding more and more flexibility in relation to successful dietary guidelines (Long, 2011).

As an aspect of dietary education, particularly for professionals doing direct care, there are recommendations for competence regarding eating disorders (McCarvill & Weaver, 2014). The propensity for eating disorders to develop, especially among adolescent girls, is an important factor to incorporate in curriculum. How to address healthy eating and be attuned to “disordered eating behaviors” need to be part of the competencies of dietary education for diabetes.

Generally after the introduction of insulin, weight gain can occur and is another concern in relation to diet and the diabetic patient. Majumdar, Bethin, and Quattrin (2014) studied the effects of weight gain with youth receiving a diagnosis of type 1 diabetes and receiving nutritional education. They concluded that education alone was not sufficient to retard an increase in body mass index (BMI) and recommended a family-based approach or additional interventions.

One further note regarding diabetes diet education is that the American Diabetes Association reports that up to 10% of patients have a comorbid gluten intolerance and/or celiac disease (Meadows, 2014). This necessitates an inclusion of gluten-free eating in overall diet education for this population.

Psychosocial Supports

Although self-care and nutritional education formed a base for supporting patients with type 1 diabetes and improving outcomes, research reinforced the need for further interventions (Majumdar, Bethin, & Quattrin, 2014). In a 2001 report from the Psychosocial Therapies Working Group (Delamater et al.) evidence was provided on the essential role psychological factors play in the management of diabetes in both children and adults.
A series of psychosocial modalities have been tried to support better patient outcomes, adherence and psychosocial functioning. The first focus, as youth/adolescents were of primary concern, was family involvement and strategies parents could use to support their children. This was followed by Multisystemic Therapy (MST) and diabetic support groups of various kinds. In tandem psychological approaches such as behavior modification, cognitive behavioral therapy (CBT) and problem solving therapy (PST) as part of various psychotherapeutic approaches were utilized. The search began for what modalities, in what forms and what combinations would support better adherence.

**Family and parental involvement.** “Family factors are significantly associated with regime adherence and metabolic control in children and adolescence” (Delamater et al., 2001, p. 1286). It is well established that the family plays a crucial role in diabetes management success and outcomes. “Research findings indicate that family-based behavioral procedures…have improved regimen adherence and glycemic control” (Delamater et al., 2001, p. 1287).

Empirically examined psychosocial interventions, those involving multiple family members seem to have had the most promising results (Harris, 2006).

Williams et al. (2009) characterized type 1 diabetes as a “family disease” due to two primary factors: First, the necessity of the parental role in protocol management as onset is generally in childhood. Second, because the family system in large part determines the child’s acceptance and coping ability with the disease. Further research by Moreira, Frontini, Bullinger, and Canavarro (2013) supports the importance of family health and cohesion because “more cohesive family environments predict better glycemic control and higher levels of adherence” (p. 348). Williams, Sharpe, and Mullan (2014) looked at family support as it related to the
developmental challenges of adolescents and found that levels of anxiety (which affect adherence) could be predicted by the level of family involvement.

There is widespread agreement that the family and their involvement are crucial for the child and adolescent to succeed in managing their type 1 diabetes. There are studies examining aspects of family involvement from the singular roles of father or mother, to parental stress and coping, family cohesion and marital stress (Dungan et al., 2010; Jasser, Linsky, & Grey, 2014; Popp et al., 2012). What affects the family affects the patient and research is trying to identify variables that need addressing and specifically what has the greatest impact on patient health.

The family, as a support system, can be comprised of many different individuals including parents, siblings, extended family and friends. The primary parental role, be it filed by biological parents, adoptive parents, grandparents or other caregivers, is essential in supporting adherence from childhood through transition. A longitudinal study through the University of Utah (King, Berg, Butner, Butler, & Wiebe, 2014) examined parental involvement and the effect on adolescents’ adherence. The study demonstrated that “Multiple facets of parental involvement in diabetes management decline linearly across the adolescent years, and that longitudinal declines in both mothers’ and fathers’ involvement predict deterioration in adherence across adolescence (p. 429).

Parental roles can be divided into two forms of caretaking. First, “parental responsibly, in which parents complete particular tasks for youth,” and second, “parental monitoring, in which parents supervise the youth’s independent completion of self-care tasks” (Hilliard, et al., 2013, p. 388). These roles change with the maturation of the child and generally shift from parental responsibility to parental monitoring. The danger seems to be in relinquishing monitoring too soon, which can result in deteriorated outcomes for the adolescent.
In a study by Berg, King, Butler, and Wiebe (2009) parental involvement was examined using different categories. Their research combined aspects of responsibility and monitoring into one category, “monitoring,” and looked in tandem at the affective quality of the parent child relationship. This affective quality along with continued monitoring was seen as primary for reducing risk factors and encouraging adherence.

This raises the question, “How can parents best model healthy management of the disease and keep their children open to their involvement?” Conflict, which can be a natural aspect of parent-teen relationships, was found to exacerbate the needed cohesion in families dealing with this disease. Conflict resulted in decreased parental involvement as teens pushed away from parents and lessoned adherence overall (Hilliard et al., 2013) indicating the need to work through conflicts to keep parents and teens communicating and cohesive. Along with minimized conflict and increased cohesion, Osborne, Berg, Hughes, Pham, and Wiebe (2013) studied aspects of communication between parents and children, how fully parents disclosed the particulars regarding management to the child, or conversely how secretive they were, perhaps in an effort to shelter and protect the child. The given pattern of behavior on the part of the parents greatly affected the adolescent transition period and study results supported open communication about disease management from the beginning. Also from the beginning how parents handle their own stress and model good coping strategies is important (Popp, et al., 2012).

Palmer, et al. (2011) looked at the structure of parental involvement with their child throughout the transition period. Their data produced an interrelated set of three variables to be considered, that of relationship quality, behavioral involvement and monitoring. How parents interact and support their child has an enormous effect on outcomes. In addition, parental attitudes evidently contribute to various co-morbidities that can challenge transition
independence. Mullins et al. (2004) looked at the relationship between parental overprotection of their children with type 1 diabetes and depressive symptomatology. Parental overprotection seemed to increase perceptions of vulnerability on the part of the child, resulting in a depressive response. As these comorbidities, such as depression, work against maintaining adherence in the crucial transition phase of adolescence, parental attitudes and support of a healthy family system are important.

Given that parents play such a crucial role in the health of their diabetic child, support for their functioning is a needed aspect of comprehensive treatment. Information about parenting strategies, ways to improve communication with their child, a greater understanding of how to support the transition through adolescence, and help in coping with their own stress and the impact on couple life (Dungan et al., 2010) needs to be available to parents.

Finally the use of persuasive strategies has been discussed in the literature. Given that research has supported for some time the notion that adolescents, and eventually the adults they become, have better adherence when parents are actively involved in management both during childhood and through the transition phase, using persuasive strategies has been explored. Berg, et al. (2013) outlines strategies including reminding the adolescent to manage their diabetes, talking to them about improved management and persuading them to do more in regards to management. These verbal persuasions were all geared at improving adherence and have a precedent in the medical community with other diseases (Stephens et al., 2009). The caution however from several research studies is how adolescents will respond to these messages. Berg et al. (2013) found many “persuasive” messages from parents can be interpreted as intrusive by adolescents, while deTurck and Miller (1983) found it was not a simple equation, and that
adolescents respond well or not to persuasive strategies based on a number of factors including age, gender and communication style.

**Multisystemic therapy (MST).** Multisystemic therapy or MST is an effective approach to supporting adolescents with type 1 diabetes. Ellis et al. (2005) began researching MST as a viable therapy to support adolescent adherence in type 1 diabetes patients and found a significant increase in adherence. They (Ellis et al., 2007) describe MST as “an intensive, home-and community-based intervention originally designed for youth presenting with serious antisocial behavior” (p.168). Ellis et al. (2007) further state that MST “is an ideal intervention for adolescents…as it targets the multiple systems (i.e. child, family, peer, school, health care provider) implemented in poor adherence and metabolic control” (p. 168). MST is a therapeutic intervention that takes place in the home and has family intervention components. Data supports reduced hospital visits and improved regimen adherence when using MST (Ellis et al., 2007). In a further study, also in 2007, Naar-King, Ellis, Idalski, Frey, and Cunningham explored MST in 127 adolescents with type 1 diabetes to assess the effect on “parental overestimation of adolescent responsibility for completion of diabetes care” (p. 178); in other words, those diabetes self-care tasks parents assumed their child was taking responsibility for. A problem that often occurs in the transfer of these responsibilities is the lack of clear definition regarding accountability for completing care tasks. Parents assume the adolescent is completing tasks, whereas the tasks are often neglected causing a decrease in outcomes.

What underlies MST and how specifically does it work? MST is a treatment theory that utilizes social-ecological and family systems theories of behavior. Interventions associated with MST target the adolescent, the family as a whole, and the greater community regarding patient care. MST “is designed to target the multiple systems within which youth with serious problems
and their families are embedded” (Ellis et al., 2007, p. 181). MST is not a “one-size-fits-all approach” and the different treatment components can be adapted to fit specific health needs like those with type 1 diabetes. Ellis et al. adapted this model for use with adolescent diabetes patients and their families. They began by conducting an assessment of family strengths and weaknesses and creating goals based on the individual family. They then customized interventions for each family unit to address the adherence problem. These interventions included education and training for parents and adolescents, cognitive and behavioral therapies (especially in the case of comorbidities such as depression) and family systems therapy. The family systems aspect of MST addresses supports for helping parents disengage and effectively transfer adherence responsibilities to the adolescent.

In a review by Pane, White, Nadorff, Grills-Taquechel, and Stanley (2013), studies on MST were examined in relation to treatment for serious psychological issues and severe health problems, specifically including type 1 diabetes. The literature supported the assumption that MST is effective for decreasing maladaptive behaviors and increasing adaptive behaviors in youth, thereby increasing adherence and positive outcomes with type 1 diabetes. Overall there was mixed support in the literature for the success of MST versus other treatment modalities. No studies looked at success rates in different settings, and four studies found MST more cost effective with severe populations.

In an even more recent review of the literature (2014) conducted in the Netherlands by van der Stouwe, Asscher, Stams, Dekovic, and van der laan, a meta-analysis was performed to assess the effectiveness of MST. Conclusions stated that MST is most effective with a population age 15 and under. Recommendations were made for a more peer-focused approach to MST with older adolescents, but effectiveness was considered strong overall.
An additional study again assessing effectiveness (Ellis et al., 2012) designed research to investigate MST versus a more easily administered telephone support system with qualified therapists and utilizing a client-centered approach. Again the attempt was to assess effectiveness of strategies for youth with diabetes and difficulty with maintaining good metabolic control. Their results conclude that “youth receiving MST had a significantly greater reduction in HbA1c than youth receiving telephone support” (Ellis et al., 2012, p. 212). Overall the literature supports MST as an effective way to combat adherence issues in youth with type 1 diabetes. Various factors to do with efficaciousness are still being researched.

Support persons. Within the psychosocial realm of support for patients with diabetes, the somewhat undifferentiated role of “support person” is critical. This can be one individual or several parents, professional caregivers, or lay persons. Harris and Lustman (1998) suggested the inclusion of a social worker on the diabetes team early on, while Freeborn, et al., (2013) stressed the importance to patients, especially youth, of having the connection to one or more actual persons who understood and could support their diabetes management.

In a 2001 study conducted in Northern Finland, Toljamo and Hentinen looked at adults with diabetes and self-care of glycemic control, finding that better self-care was more prevalent with individuals who had support from family and friends, versus those living alone and sans support persons. This same study pointed out that the role of initial support person, historically the nurse, was always perceived as equally as much social support as medical support.

Mentoring. Nurses have traditionally been seen as the natural mentor for the management of type 1 diabetes and the concept of mentoring has become integral to diabetes care. For the adolescent population in particular, it fulfills two necessary functions, providing education and providing counseling support. In the late 1990’s when social supports were just
coming on the radar, Blake (1997) at the University of Kentucky reviewed the current literature and determined that there were a very limited number of psychosocial support systems for adolescents and very few psychological supports had been tested. Blake’s research proposed a mentoring program that rather than using the traditional nurse or adult care professional, adolescents would be paired with a peer; a qualified young adult knowledgeable about diabetes. The concept of peer mentoring for adolescents was and is a natural fit. Current research (Lu et al., 2014) continues to demonstrate the success of peer mentoring to promote adherence with adolescents and young adults.

Research continues to examine the critical role of mentor in various forms and as performed by various individuals. Barnetz and Feigen (2012) did an in-depth study examining the relationship between adolescents and their mentors; essentially asking how the relationship helped teens to cope with their diabetes. In addition to traditional nurse mentoring, peer mentoring, and various mentoring programs utilizing different professionals, research has looked at ways to disseminate the mentoring process. Suh et al. (2014) conducted a randomized controlled trial of an internet-based mentoring program for patients with type 1 diabetes. Their results conclude that although overall HbA1c did not improve with the mentored group versus the control group, there was an increase in blood sugar monitoring with the mentored group, which could have clinical implications if sustained over a longer period of time. Their study was only 12 weeks and would need to be repeated with a longer timeframe.

In person, one-on-one, through group support, online or via mobile devices, through virtual sources; all of the previous have been, and continue to be, investigated. Newall, Hall, Paley, James, and Gordon (2004) conducted research on mentoring through mobile devices using an Intelligent Tutoring System. The goal, as always with this population, was to improve
adherence and glycemic control. Results ascertained that providing a permanently accessible mentor as an ongoing support person to provide patient education and support proved a successful approach.

**Support groups.** Another popular form of diabetes support, which has been extensively examined in the research, is that of support groups. A form of mentoring, social support, education, and emotional support, group formats can additionally meet the social needs of the adolescent with type 1 diabetes. Freeborn, Dyches, Roper and Mandleco (2013) specifically recommend diabetes camp and support groups for helping eliminate the feelings of “difference” that teens with diabetes experience. In an early study (Merrill, 1993), diabetes patients with advanced complications, specifically visual impairment, were studied for outcomes after a 10-week formalized support group. The group incorporated both intellectual learning about the disease as well as emotional support in the form of participant sharing. Results varied between individuals, but reported outcomes included lowered blood glucose, positive functional and emotional changes and improved diet and exercise routines.

More recently support groups continue to be investigated from a number of perspectives. Cespedes-Knadle and Munoz (2011) reported on the implementation of a teen support group designed to improve both adherence and psychosocial functioning. Markowitz and Laffel (2012) targeted specifically that critical transition from parent care to self-care of the adolescent and utilized a support group for aiding in successful transition. A number of important elements arose from this study, including the pertinence of teens relating about interactions with non-diabetic peers and the participant identification of the need for a multidisciplinary team to support overall care.
In a more directed study, Sachmechi et al. (2013) divided their research subjects into three groups; one with just direct medical care, one with direct care plus education, and a third with direct care, education, and a peer support group. The factor with the greatest effect on HbA1c was the inclusion of education, although result indicated there may be additional benefits from support group involvement.

In a 2013 study by Corathers et al., research examined various roles and strategies of diabetes support group facilitators in an attempt to isolate variables that would contribute to success. Study results affirmed a clear need for the establishment of best practices. These would include ongoing and established educational curriculum for facilitators.

In a further study, Audet in 2014 dissertation research examined the difference between face-to-face support groups and internet support groups. Variables such as self-care behavior, and diabetes control, were used to assess an overall quality of life for participants utilizing group support. Audet’s primary research hypothesis was that social support does indeed improve quality of life for diabetes patients. Results indicated an improved quality of life for both groups with 93% of the face-to-face group reporting improvement whereas only 78% of the internet group, indicating a higher success rate with the in-person group.

**Psychological Supports**

More traditional psychological interventions for diabetes joined the ranks not only to support adherence, but to effectively deal with the overall psychological stress of diabetes and the numerous comorbidities. Growing support for a team approach and evidence for the need of psychological and social supports gained popularity during the 1980’s and 1990’s. In their 1998 research, Harris and Lustman stressed the importance of the psychologist for two reasons: first, they can act as a provider of direct care to the patient and second, they can become a consultant
for the entire team. The psychologist as team member has become a recognized part of the interdisciplinary approach, and various modalities have been employed to treat as needed. In addition to the psychosocial therapeutic approaches previously mentioned, including family, group approaches, and MST, the research identifies cognitive-behavioral therapy (CBT) and problem solving therapy (PST) (Eccleston, Palermo, Fisher, & Law, 2012) as primary psychological approaches to working with the mental health concerns of patients with diabetes.

   Cognitive behavioral therapy. Given that adherence to protocol continues to be a primary issue with type 1 diabetes patients, and, further, that adherence is a behavioral issue that is affected by emotional and psychological components, a cognitive behavioral approach to supporting both adherence and patient mental health became a natural fit. Cognitive behavioral therapy (CBT), having achieved success with mental health challenges in the population at large, began being utilized with diabetic patients. Massengale writes in her 2005 article examining adolescents with type 1 diabetes and the pervasive comorbidity depression, that “Therapy of this type [CBT] helps children to recognize their own thoughts and feelings and then deal with stressful situations” (p.144), thus better preparing them for the transition period where they will assume responsibility for their diabetes care. CBT additionally has the advantage of being adaptable in addressing developmental milestones and works well with adolescents as it can be applied to their particular developmental tasks (Holmbeck, Devine, Wasserman, Schellinger, & Tuminello, 2012).

   Overall the literature contains a plethora of articles on utilizing CBT with diabetes patients. Snoek et al. (2008) applied CBT in a group setting and compared the results to an educational approach that promoted blood glucose awareness training. They found CBT to have greater long term effects on overall HbA1c, especially in patients with comorbid depression.
Adriaanse (2010) studied type 1 diabetes patients and found improved glucose control with CBT. Salamon, Hains, Fleischman, Davies, & Kichler (2010) studied adolescents and improved adherence in social settings using CBT. Esbitt, Batchelder, Tanenbaum, Shreck, & Gonzalez (2014) employed CBT in a group setting with adults that had poor blood glucose control and comorbid depression in an attempt to improve treatment adherence. They utilized qualitative data to determine findings that suggested participation in group CBT did improve diabetes-specific distress and reduce depressive symptoms overall. Studies examining CBT as an intervention with patients exhibiting poor control over their diabetes protocol routinely show significant improvement.

Amsberg et al., (2009) conducted a randomized control test with 94 patients that were assigned to either a control group or treatment group. They measured HbA1c as well as self-care and psychosocial factors and concluded that CBT is a promising approach to supporting patient self-management, improving HbA1c and overall well-being. Along these same lines, Mofrad (2014) reviewed the introductory book *Diabetes and Wellbeing: Managing the Psychological and Emotional Challenges of Diabetes Types 1 and 2* by Nash that looks at the use of CBT for various psychological difficulties associated with diabetes. This approach [CBT] is perhaps ubiquitously seen as the primary therapeutic approach to improve both adherence and overall mental well-being.

Ridge et al. (2012) studied longer term effects of CBT on HbA1c. They compared a group of patients who underwent treatment with CBT versus “usual care” and found some difference, especially at the one year mark, but over time (2 to 4 year marks) the difference was small and they recommended further studies be conducted.
Problem solving therapy. In numerous studies on CBT and diabetes or chronic illness, the inclusion of problem solving therapy (PST) can be seen as part of the cognitive approach (Salamon, Hains, Fleischman, Davies, & Kichler, 2010; Eccleston, Palermo, Fisher, & Law, 2012). Eccleston et al. (2012), however, differentiate PST as a completely separate therapeutic category or treatment class in line with CBT, MST and family therapy. Whether combined with CBT or applied as an individual construct, the literature is scant on PST specifically in relation to diabetes treatment. Hill-Briggs et al. (2011) looked at the effects of PST with a low-income population of diabetes patients and found clinically significant improvements in both clinical and behavioral outcomes. Salamon et al. (2010) concluded that PST was particularly helpful in improving adolescent adherence in social situations. Massengale (2005) saw PST as an essential part of helping patients to cope. Eccleston et al. (2012) studied both children with chronic illness and their parents being treated with various psychological approaches. They found improved parent behavior and parent mental health in regards to PST in particular.

Summary

Overall, the inclusion of education, psychosocial and psychological supports has become a necessity in addition to medical interventions for patients with type 1 diabetes. Nonmedical approaches are indispensable for supporting glycemic control and adherence, as well as crucial in treating the comorbid disorders, such as depression, that accompany this disease. The literature supports the need for therapeutic interventions, especially with the adolescent patient or during the transition period from dependent-care to self-care. Various forms of psychosocial supports, including family and parental involvement, MST, mentoring and support groups, act to buttresses the individual patient for better adherence and glucose control. Psychological approaches including CBT and PST show consistent improvement with patients when
administered through a variety of forms, and with various aspects of the diabetic population. Generally, all these approaches include some kind of educational component coupled with a social-emotional provision. Patients benefit from support through various methods, as research works to identify the most effective systems and best practices.

**Adlerian Approach Explored**

The tenets of Adlerian psychology are well suited to both an understanding of the needs of the adolescent with type 1 diabetes, as well as geared to therapeutically supporting this population. An awareness of the client/patient as part of a social whole, one in which they are working to feel adequate, where behavior is goal driven around their potential feelings of inadequacy in a desire for compensation, all fit with what the literature surmises as important for treating type 1 diabetes. If the perceived inadequacy results in discouragement, it can manifest in behavior that separates the individual from their social world and affects motivation to adhere to necessary protocol. An Adlerian model, and particularly how compensation manifests in these patients, is worth exploring.

**Current Literature**

There is essentially no literature specifically on the topic of Adlerian psychology and type 1 diabetes. However, the one article that looked at both Adlerian approaches and type 1 diabetes, examined Brief family therapy and its impact (Croake & Myers, 1989). Another more recent study (Ko et al., 2014) examined patients with type 2 diabetes and prevention of hypoglycemia utilizing Adlerian based reinforcement techniques. We know from numerous studies (Ellis et al., 2012) that face-to-face therapeutic interventions, those that engage the patient socially, are more likely to improve glycemic outcomes.
Further literature on Adlerian techniques directed at helping adolescents is more prevalent. Dinkmeyer (1986) conducted research regarding Adlerian family therapy that looked at goal setting and striving for significance in moving towards more constructive behavior. Although not specifically about type 1 diabetes patients, the overall approach could work well with a goal of adherence and support towards that goal. In 1995, Clarke studied encouragement and the four goals of Adlerian psychotherapy (responsibility, respect, resourcefulness and responsiveness). Encouragement, a basic principle of Adler’s work, is highly applicable when getting teens to feel more motivated towards responsibility, self-respect, resourcefulness and responsiveness, which all affect adherence.

In further examining the adolescent period in particular, we can apply an understanding through Adler of the need for teens to belong and be recognized, “By fitting in, they can find their station in the world, the position from which they can begin to move forward in life” (Ballou, 2002, p. 155). This need to belong supports the success of group interventions and again moves the adolescent towards better adherence.

In a recent article (2013), Rosselet and Stauffer examined Adlerian play therapy and the use of role playing to improve skills. This approach inspired change while additionally improving the child/adolescent’s social skills and overall emotional development. A similar approach could be researched with adolescent type 1 diabetes patients.

**Inferiority and Compensation**

Just as Goffman (1963) described the psychological repercussions of having a “stigma” from a disability or difference, Adlerian theory is concerned with feelings of inferiority and the effects on mental health. Adlerian theory postulates two levels of emotional inferiority that occur in childhood. First, a primary inferiority that is natural to the state of childhood
dependency and can be outgrown or will naturally lesson with maturation and adequate parenting. A secondary inferiority can occur with more compromised circumstances or a disability. When someone starts life with “organ inferiority,” they may develop secondary or more pronounced feelings of inadequacy (Bagby, 1923). Diabetes in childhood can generate a perceived deficiency and characteristically results in feelings of difference, inferiority or inadequacy. Since feelings of this nature are painful, there are persistent attempts to compensate, to achieve normalcy, a striving from a “felt minus position to a perceived plus position” (Western Pennsylvania Society of Adlerian Psychology). These attempts for normalcy are in essence acts of compensation, and, according to Adler, they are present when health is compromised or if feelings of inferiority predominate (Bagby, 1923).

In Adlerian Psychology, or as it is also known Individual Psychology, compensation generally takes three forms. The first is somatic compensation. In this form the body system compensates for the malfunction or inferior system (Carlson et al., 2006). With type 1 diabetes, the blood glucose levels can get dangerously high causing the kidneys to flush glucose out through the urine. The second form of compensation is sympathetic compensation where adjustments are made from outside the individual to accommodate the condition. In the case of a broken leg, a sympathetic compensation could be using crutches. In the case of diabetes, injecting insulin is a sympathetic compensation. The third form of compensation is psychic compensation. Here the individual responds in a psychological and behavioral manner. They may withdraw or hesitate in order to feel protected or act in ways that attempt to compensate for the emotional inferiority. A person with Type 1 Diabetes may take fewer risks or refrain from physical activity in an effort to prevent hypoglycemia.

If the feelings of inferiority are too pervasive, and the adolescent doubts they can
overcome them, the possibility of overcompensation can occur. Overcompensation happens when, in the striving for normalcy, the individual goes too far in trying to balance the scales (Carlson et al., 2006). They may seek a level of power or dominance that is so exaggerated it can become pathological; their behavior having a certain grandiosity (Adler, 2004). This can lead to reckless behavior in the type 1 diabetes patient, especially the adolescent; a belief that they do not need to follow adherence protocol.

What is important to understand about compensation, and the inferiority that drives it, is that it can form a pervasive pattern sustaining undesirable behavior that will continue indefinitely unless interrupted. With the type 1 diabetes patient, it is important to break the cycle, and interrupt the undesirable behavior because non-adherence behaviors can have life threatening consequences. One such type of undesirable behavior presents as an ongoing passive reaction. The patient, in particular the adolescent, believes in their inferiority and the need to be taken care of that comes out of childhood. They cannot transition successfully to a more independent protocol adherence. Carlson, Watts & Maniacci, (2006) comments:

Children who inherit diabetes frequently develop a style of life around the issue of getting; sometimes they develop a lifestyle type Adlerians refer to as “the getter.” They arrange assumptions and convictions about the world and their place in it to focus on what and how much to get. This is understandable given their medical condition. (p. 47)

It is not just the child or adolescent that attempts to compensate when faced with type 1 diabetes and its effects. Parents also feel inferior and experience a need to compensate. Hackworth et al. (2013) mentions the challenges parents experience and the need to manage anxiety and frustration. Parents can experience not only guilt and stress, but feelings of inferiority as well. In fact, the entire family system is forced to compensate in some way. The
goal in Adlerian therapy would be to support this compensation with positive interventions that address the inferiority.

Inferiority and the reaction of compensation are a predictable pattern with type 1 diabetes for both parents and their children making this disease a natural fit for an Adlerian approach. Awareness around feelings of inferiority, beyond acknowledging the innate organ inferiority, is aided by an Adlerian viewpoint in managing the mental health of diabetic adolescents. Being aware of feelings of inferiority, which do not support needed autonomy, is critical.

**Goals and Therapeutic Interventions**

Inferiority and the need for compensation in Adlerian psychology lead to a “fictional goal” generated by the individual which is subconsciously thought to be a way out of the inferiority (de Rochemont-Best, 2007). The individual may be driven to achieve success in some area or may be generally working to overcompensate based on their perceived goal, in either case the goal is a motivator and behavior in general is predicated on the possible end result or fictional outcome.

In Adlerian therapy, the professional assesses the client’s patterns of dealing with life, their early experiences and birth order, developing an understanding of their fictional goal. Therapy then unfolds in a manner that explores the replacing of the fictional goal with more realistic and beneficial goals as the client is encouraged to overcome their feelings of inferiority (Carlson & Englar-Carlson, 2013).

A natural intervention process that could offer support and encouragement in responding to the feelings of inferiority and need for compensation which patients/adolescents with type 1 diabetes experience is a form of Adlerian goal work. Setting realistic goals, and achieving success, can help mitigate feeling of inferiority. When the patient has a grasp on the needs and
demands of their disease and can adhere to protocol, it naturally increases the feeling of competence. Adolescents in particular, do well with concrete forms of support such as goals. Realistic, achievable goals motivate teens. de Rochemont-Best (2007) found:

When trying to motivate the discouraged adolescent and make them use their private logic, expectations about their future should be highlighted. This can take the form of helping them list their short and long term goals in life. The short term goals are the things that will have short term impact on their overall life. Long term goals, on the other hand, are the things that will have a profound effect on their life as a whole. By listing such goals, the adolescent can then list the things that they need to do to achieve such goals. In the same manner, they should be asked to list the things that may get in the way of achieving listed goals.

Reducing the psychological burden of type 1 diabetes for the transitioning adolescent through the use of Adlerian techniques appears theoretically promising. Methodologies such as encouraged goal setting could greatly improve desired adherence outcomes and support adolescent mental health. More research is needed specifically in the area of Adlerian techniques for this targeted population.

**Future Research/More Studies Needed**

In this review of the literature, on adolescent mental health and the diagnosis of type 1 diabetes, there is a significant body of literature as well as areas that need further study. In the area of further study, Delamater et al. (2001) concluded that although a “substantial amount of behavioral science research has demonstrated that psychosocial factors play an integral role in the management of diabetes in both children and adults…..programs for specific populations” (p.1289) is an area where more research is needed. They further discussed the various barriers to
the research process including dependence on self-reporting, absence of longitudinal studies and small sample sizes, and they strongly recommended more “culturally sensitive interventions” (p.1288).

In the following decade, Ellis, Berio, Carcone, and Naar-King (2012) recommended a future research focus that would assess treatment techniques and in particular those that support motivation for change. They hypothesized a correlation between the client’s motivation for change and their adherence to treatment. Their conclusions determined a direct correlation between levels of motivation and resulting glycemic control through protocol adherence.

In addition to treatment techniques, research has addressed educational needs. In 2011, Long published a literature review of dietary education for adolescents with type 1 diabetes and concluded there was scant literature that included the adolescent’s point of view. The conclusions stated that “Limited published evidence is available on factors that influence the educational needs of adolescents with type 1 diabetes” (p. 292) and further research, especially research that targeted problem solving strategies, was recommended.

In general there are a plethora of studies on supporting type 1 diabetes patients, and an overall awareness in the literature of adherence being the central goal of mental health treatment. There is apparently room for more nuanced studies in many areas including culturally specific interventions, longitudinal outcomes, various qualitative and quantitative approaches that would expand sample size and methodology. More in-depth studies could be conducted on constructs such as motivation that seem to play a primary role in adherence, as well as increasing research on the educational needs of adolescent patients.

In regard to Adlerian psychology there is an enormous gap in the literature that needs filling. Studies on specific techniques, an Adlerian approach with adolescents, work with
compensation and improving adherence, all could benefit patients. A spectrum of Adlerian interventions and goal work are relevant areas of research to expand best practices with type 1 diabetes patients.

**Conclusion**

This literature review sought to explore current research related to adolescents with type 1 diabetes and the importance of supporting mental health. Type 1 diabetes is an early onset disease that can be life threatening and strict adherence to protocol is needed. This protocol includes a rigorous daily routine of insulin administration, blood glucose checks and prescriptive dietary guidelines and exercise requirements. The daily maintenance of this routine is stressful and difficult to uphold often causing a kind of “diabetes burnout” (Barnard, Peyrot, & Holt, 2012). This “burnout” can decrease the patients’ ability to sustain a desired level of care and lower health outcomes, those characterized by HbA1c or glycated haemoglobin.

Determining factors for patient ability to follow protocol and maintain desired levels of health are largely predicated on motivation and mental health. If the patient is adequately supported, encouraged and empowered to cope, adherence and health outcomes are far greater. This understanding has led to a large body of research exploring what modalities work best and how to administer that needed support to patients.

As disease onset is usually childhood, parents generally manage protocol and can experience burnout needing support in their caregiving role. In adolescence the transfer of responsibility takes place with the burden of protocol management placed on the adolescent patient. This is a critical time for two reasons. First, the adolescent is challenged with a developmental period that contains natural tasks that can be contrary to conformity and following protocol. They can often choose inclusion in group norms over adherence
requirements, jeopardizing health. Second, research supports that the habits developed during this adolescent transition time often persist throughout adulthood becoming lifelong determinants of overall health. So, good habits, in the form of strict adherence to diabetes protocol, are crucial. In essence, the transfer of responsibilities takes place when the patient is perhaps the least equipped to handle it emotionally, and when it is most critical for long-term health, making the support of this transition period a primary concern for diabetes research and care.

In the process of supporting transition and good care, there are many treatment challenges and considerations. There are physical challenges such as blood sugar monitoring, insulin administration, diet, exercise and physical assistance needed to manage the disease. There are psychological challenges that include the stress of managing a life threatening disease, the feelings of “difference” and inferiority that occur, and numerous comorbidities that often need addressing, like; depression, anxiety, adjustment disorder, bipolar, identity disorder and eating disorders.

Education was the original way of supporting patients with information about good self-care and diet. Over time more psychosocial and psychological supports were incorporated for patients with type 1 diabetes. Family involvement and support for parents in transitioning their child were established. Parental persuasive strategies were developed, multisystemic therapy (MST) was found successful, and support persons such as mentors and group support were tried, disseminating both education and mental health awareness. In recent years, cognitive-behavioral approaches (CBT) and problem solving therapy (PST) have led the field with successful outcomes.

In keeping with the purpose of this paper and its requirements, an Adlerian approach to the transitioning adolescent with type 1 diabetes was considered. Adlerian constructs look
promising although there is no body of research to substantiate it. The concepts regarding inferiority and compensation are a natural fit for early onset disease. Encouragement, motivation and goal setting, as well as seeing the patient within the context of the social whole as Adlerian psychology does, supports existing research on what works with the type 1 diabetes patient.

Overall, more research is needed in a number of areas to include special populations, cultural constructs, and expansion of methodologies and samples sizes as well as specific interventions for best practices with type 1 diabetes patients, adolescents in particular. Long-term outcomes using various approaches needs further study and the field is wide open for research on applied Adlerian techniques in regard to improving adherence in type 1 patients.
References


Barnetz, Z. & Feigin, R. (2012). “We didn’t have to talk”: Adolescent perception of mentor-mentee relationships in an evaluation study of a mentoring program for adolescents with


doi:10.1080/001933922.2011.613898


doi:10.1177/0145721713476347


Grant, L., Lawton, J., Hopkins, D., Elliot, J., Lucas, S., Clark, M., Maclellan, I., Davies, M.,
doi:10.1111/dme.12164


doi:10.1037/0012-1649.43.2.522


Majumdar, I., Bethin, K., & Quattrin, T. (2014). Weight trajectory of youth with new-onset type 1 diabetes comparing standard and enhanced dietary education. *Endocrine*. Advance online publication. doi: 10.1007/s12020-014-0469-6


youth with type 1 diabetes. Journal of pediatric psychology, 36(50), 596-605.
doi:10.1093/jpepsy/jsq019

Multisystemic therapy for child non-externalizing psychological and health problems: A
doi:10.1007/s10567-012-0127-6

possible. The Diabetes Educator, 34(1), 54-58.

1332-1340. doi:10.1056/NEJMra1110560

functioning in relation to narratives of children with chronic illness. Journal of Pediatric
Nursing, 29(1), 58-64. doi:10.1016/j.pedn.2013.07.004

Ridge, K., Bartlett, J., Cheah, Y., Thaomas, S., Lawernce-Smith, G., Winkley, K., & Ismail, K.
(2012). Do the effects of psychological treatments on improving glycemic control in type
1 diabetes persist over time? A long-term follow-up of a randomized controlled trial.
Psychosomatic Medicine, 74(3), 319-323. doi:10.1097.PSY.0b013e31824c181b

Roaten, G.K., & Roaten, D.J. (2012). Adolescent brain development: Current research and the
impact on secondary school counseling programs. Journal of School Counseling, 10(18),
1-27.

toward a better future [Supplement 2]. The Journal of the American Osteopathic
Association, 113(4), 4-5.


