



Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/15879
DOI URL: <http://dx.doi.org/10.21474/IJAR01/15879>



RESEARCH ARTICLE

PSYCHOSOCIAL ISSUES IN ADOLESCENTS WITH TYPE 1 DIABETES MELLITUS

Heena Dabas and Dr. Jyoti Sarin

Manuscript Info

Manuscript History

Received: 15 October 2022

Final Accepted: 18 November 2022

Published: December 2022

Key words:-

Type 1 Diabetes Mellitus, Adolescence,
Psychological Stress, Psychosocial
Issues, Self Management

Abstract

Type 1 diabetes mellitus (T1DM) is a form of DM that results from autoimmune destruction of insulin producing beta cells of the pancreas. There is enough discussion about the pharmacological management of the disease but its psycho-sociological aspect has not been explored much. Patient with T1DM often experience psychological stress during the first year of diagnosis.ⁱⁱⁱ Approximately 36% of patients have some sort of psychiatric disorder in the first year, which may be related to both stress and treatment side effects. The lifelong administration of insulin, a restricted diet and complications from diabetes can cause great difficulties in living a normal life for patients. For optimum survival, psychological monitoring must be done along with medical treatment beginning from the diagnosis. A multidisciplinary team should be involved to assess newly diagnosed type 1 diabetes mellitus. The team should include a pediatric endocrinologist, nurse educator, dietician and mental health professional to provide specific education and support for patients. Interaction between parents, nurses, doctors and the school authority must be ensured to monitor the child's progress closely. Above all, proper education of self-care must be given so that the child can cope with his/her existing disease and maintain self-confidence while ensuring self-management.

Copy Right, IJAR, 2022,. All rights reserved.

Introduction:-

Managing and living with type 1 diabetes mellitus can be challenging at any age, but it can be more difficult during adolescence and early adulthood, as the constant daily management of T1DM often conflicts with a young person's desire to live a normal life.^{iii,iv} The first peak in the presentation of type 1 diabetes mellitus occurs between 4 and 6 years of age; and the second peak occurs during early adolescence.^v

The psychosocial adaptation to chronic disease is crucial as its management is lifelong. In developing countries like India, physical aspects of the disease are given more emphasis than psychological aspects. About 41% of people with diabetes have poor psychological well-being, but only about 10% receive psychological care.^{vi}

Psychosocial adjustment includes psychological adjustment of the individual related to disease, social adjustment related to his/her private life and profession, and economic adjustment related to the cost of the treatment process. The age at which the child is diagnosed with diabetes, the specific treatment he or she has received, the perception of health and illness, and the intellectual level that is effective in assessing these conditions play an important role in psychosocial adaptation. Although non-compliance and non-management of symptoms are seen primarily in children

and young people, compliance with this process increases in later years. Creating collaboration between adolescent, parents and healthcare providers will ease the adaptation.

The research studies have indicated that children with chronic disease are at high risk in emotional, behavioral, cognitive and social aspects.^{vii,viii} Adolescence and young adults generally experience periods of burnout in managing their diabetes.^{ix} During these periods they may experience increased levels of worry, high levels of psychological distress, isolation^x, feel unable to engage with diabetes management or services, or feel unable to cope with the daily burden of managing their condition.

Approximately 36% of patients with T1DM experience a mild psychological crisis within the first year of diagnosis.^{xi,xii,xiii} The children diagnosed with type-1 diabetes are at an increased risk of mental health conditions. Especially depression and anxiety occur in children and adolescent with type-1 diabetes at approximately twice the rate of youth in the general population.^{xiv,xv} Poor adherence to diabetes related tasks is commonly associated with poor mental health – particularly depression and eating disorders.^{xvi,xvii,xviii}

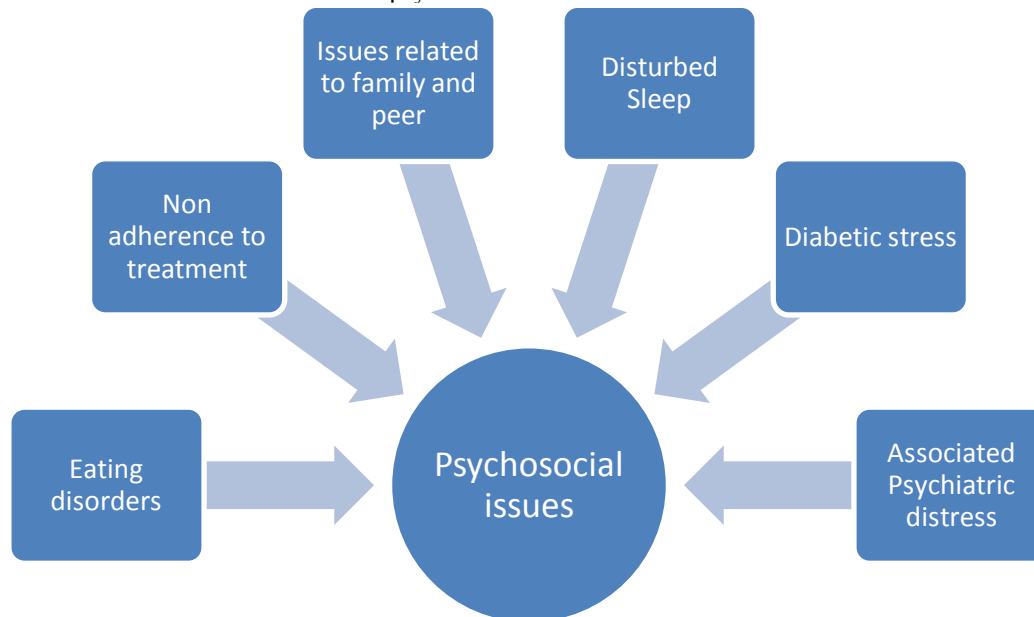
Psychosocial factors associated with chronic conditions like Type 1 diabetes mellitus (T1DM) affect symptom severity, management, and treatment adherence. The prevalence of psychosocial issues in children with T1DM is high, and these children are at risk of decreased psychological wellbeing.^{xix} The prevalence for mild, moderate and severe psychosocial issues in diabetic children to be at 8.33%, 27.38% and 20.24% respectively.^{xx}

Children with diabetes may suffer from psychosocial reactions, including feelings of being different from peers, fear of rejection, low self-esteem, insecurity related to limited educational prospects and anxiety about how others will react to the illness.^{xxi}

Khandelwal S, 2016 conducted an observational study and found that most common psychosocial abnormality was irritation (38.1%), followed by depression (36.9%) and anxiety (32.1%). The prevalence of psychosocial illness was significantly higher in T1DM patients with poorer metabolic control ($HbA1c > 7.5$, $p = 0.014$). Significant association of psychosocial illness was also noticed with poor dietary compliance ($p = 0.021$) and higher mean HbA1c level ($p < 0.001$).^{xx} Psychosocial problems can lead to nonadherence to medications, decreased quality of life, lack of interest in managing disease, and poor dietary compliance, resulting in poor glycemic control and long-term complications.^{xxii} Furthermore, apathy and lack of self-care, which are frequently seen in patients with depression or anxiety disorders, can lead to eating or exercise habits that cause diabetic control to deteriorate.^{xxiii}

Factors associated in psychosocial issues

There are certain factors associated with psychosocial issues.



Eating disorders

The combination of type 1 diabetes and an eating disorder is sometimes known as "diabulimia". The hallmark of diabulimia is that the patient deliberately takes an inadequate amount of insulin in order control their body weight (insulin restriction); this may take the form of giving too small a dose or omitting doses altogether. Some patients, for example, will take their basal insulin but omit their mealtime boluses.^{xxiv} Other disordered eating behaviors, such as dietary restriction, self-induced vomiting and binge eating, may also be present, but it is the use of insulin restriction that marks this condition out as distinct from other eating disorders.

The combination of type 1 diabetes and an eating disorder leads to elevated levels of HbA1c and an increased risk of both acute and chronic complications

Disturbed Sleep

In people with type 1 diabetes, sleep may be disrupted as a result of both behavioral and physiological aspects of diabetes and its management. This sleep disruption may negatively affect disease progression and development of complications.

Disturbed sleep patterns such as sleep restriction, sleep deprivation and sleep fragmentation in healthy young adults produce alterations in both metabolism and cardiovascular disease risk markers. Sleep restriction refers to reduced amount of total sleep (i.e., sleeping 5 hours instead of 8 hours); sleep deprivation refers to total sleep loss or prevention of sleep; and sleep fragmentation refers to sleep periods that are broken up by multiple awakenings throughout the night. Conditions that accompany type 1 diabetes (e.g., hyperglycemia, glucose variability, and hypoglycemia) may result in sleep disruption. Sleep disruption in people with type 1 diabetes may negatively affect disease progression and the development of complications.^{xxv}

Family and peer issues

The family—not only the patient—is the focus of treatment, and healthcare professionals need to consider the impact of diabetes on the family in order to provide theoretical and practical tools for successful management of the disease.^{xxvi}

Associated Psychiatric distress

Khandelwal et al, 2016 identified T1DM as a risk factor for development of psychosocial illness. Irritation, depression and anxiety were most common abnormalities. Approximately 36% of patients have some sort of psychiatric disorder in the first year of the diagnosis.^{xx} Significant association of psychosocial illness with poor dietary compliance and poor metabolic control was observed. Psychosocial assessment of every diabetic child is suggested for optimal management.^{xxvii}

Non adherence to insulin treatment

Adherence to medication, especially insulin is a key contributor to diabetes treatment outcome. Lack of adherence is common among patients with type 1 diabetes mellitus (T1DM) ranging from 23 to 77%, with a higher frequency in developing countries.^{xxviii,xxix} Poor adherence results in worse glycemic control and increased mortality and morbidity due to diabetes complications.

Screening for psychosocial issues in type 1 diabetes mellitus

“The International Society for Paediatric and Adolescent Diabetes (ISPAD) recommends that children and adolescents with type 1 diabetes are screened for psychological problems^{xxx}but there is no definite accurate guidelines based on evidence to address specific disorders or use specific tools in screening.^{xxxi}

It is therefore important that children diagnosed with diabetes and their families undergo a psychosocial assessment and a psycho-education session at diagnosis. A referral may be made to a mental health professional when there is: poor adherence and resistance to treatment, issues with family, siblings and peers, limited social support, academic difficulties, co-morbid psychiatric illness such as anxiety, depression, eating disorders, behavioral problems, body image disturbances, and so on.^{xxxii}

Proper treatment and care for a type 1 diabetes mellitus patient include intensive medical therapy, proper diet, regular health check-up, proper nursing, healthy parental care and psychological monitoring. Proper evaluation of

psycho-social responsibilities towards type 1 diabetes mellitus patients is needed among the individuals involved at each level of treatment, care and management of the same.

Roles

Role of health-care-professionals:

Ideally, every child newly diagnosed with type 1 diabetes mellitus should be evaluated by a diabetes team consisting of a pediatric endocrinologist, a nurse educator, a dietician, and a mental health professional qualified to provide up-to-date pediatric-specific education and support. Soon after the diagnosis, they should provide key 'survival' information and allow time for grieving. Insulin administration and monitoring of blood glucose levels should be carried out with the least discomfort possible, to ease the psychological adjustment to such invasive and potentially uncomfortable procedures. Routine screening of psychosocial functioning, assessment of hypoglycemic unawareness and family coping should be performed. In-depth education and behavioral interventions are best offered in the weeks and months following diagnosis.^{xxxiii}

Role of family:

Type 1 diabetes mellitus necessitates parents to take extensive responsibility for managing the condition.^{xxxiv} As part of the adjustment process, the family is required to create a 'new normal', which includes developing new priorities, reorganizing family responsibilities, renegotiating child/adolescent and parent relationships in the area of support and supervision, and formalising structures to support the integration of new routines.^{xxxv} Parents should work closely with their child's schools, day-care centres, and work settings with the support of the diabetes team to ensure that their child is being included in all types of activities. The close parental supervision necessary for children with diabetes can lead to sibling rivalry and jealousy. Parents must include the siblings in the care regimen so that they do not experience jealousy & also make them ready to assist when parents are not present. In both cross-sectional and longitudinal (lagged) analyses, multilevel modelling showed that shared responsibility was consistently associated with better psychological health, good self-care behaviour, and good metabolic control.^{xxxvi}

Role of school-authorities:

It is important to encourage school-aged children to attend school regularly and to participate in school activities and sports to facilitate the development of normal peer relationships. Considerations must be given to appropriate teacher-pupil relationships so that children with diabetes do not get singled out as misfits in the classroom. All parents of children with diabetes should be given allowance for frequent visit to the school to discuss specific needs with teachers, the principal, and, when available, the school nurse.

To conclude, proper psychological counselling for both the child and parents is a must in every stage of treatment. Children and adolescents with high self-esteem, competence and coping skills tend to show better management of their diseases. The care of children and adolescents with diabetes is especially important because these children are the most vulnerable population and they require both family and professional support in order to become healthy and productive adults. Evidence based psychosocial, behavioral, or psychiatric interventions should be made available for patients or families exhibiting conflict, disordered communication, behavioral or psychiatric difficulties or adherence problems affecting glyceemic control.

Factors such as positive parental emotional support, family communication and sufficient parental guidance with diabetes-related care have been linked to improved metabolic control, while a high level of family conflict as well as negative and unsupportive parental behavior are linked to poorer metabolic control and adherence.^{xxxvii,xxxviii, xxxix, xl, xli,xlii,xliii}. Effective psychological care not only can control blood glucose and reduce acute or chronic complications, but also can improve emotional reactions that are conducive to the development of healthy personality.^{xliv} Current treatment guidelines for diabetes include stringent metabolic goals along with the facilitation of normal social and emotional development.^{xlv}

It is therefore important that children diagnosed with diabetes and their families undergo a psychosocial assessment and a psycho-education session at diagnosis. A referral may be made to a mental health professional when there is: poor adherence and resistance to treatment, issues with family, siblings and peers, limited social support, academic difficulties, co-morbid psychiatric illness such as anxiety, depression, eating disorders, behavioral problems, body image disturbances, and so on.^{xlvi}

Management Of Psychosocial Issues

Effective management of diabetes requires complex, continual, and demanding self-care behavior. Considering that psychosocial impact is a strong predictor of mortality and morbidity in diabetes patients, integrating psychosocial aspects at all levels of diabetes management is important for better treatment adherence to achieve good glycemic control.

The interdisciplinary diabetes health care team should maintain regular, consistent and uninterrupted contact with patients and their families. When clinic visits are missed or not frequent, other modes of contact should be made available such as by phone, SMS texting, or email.

1. Health care professionals must be made aware of the biopsychosocial model of managing diabetes, and be aware of psychosocial aspects of diabetes mellitus.
2. Where patients are poorly literate, diabetes education may be facilitated using interactive modules such as diabetes literacy and numeracy education toolkit.
3. Creating public awareness about psychiatric comorbidities with diabetes, and diabetes occurring with psychoactive drugs, is recommended^{xlvi, xlviii},

Certain therapies also help in overcome the psychosocial issues such as:-

Cognitive Behavioral Therapy

Cognitive behavioral therapy (CBT) should be recommended either alone or in combination with other strategies to diabetes patients with comorbid psychiatric disorders, or to improve outcomes.^{xlix, l}

Motivational Therapy

Long-term motivational therapy with suitable follow-up is recommended in combination with CBT to lower glycated hemoglobin (HbA1c)

Problem Solving therapy

Problem-based approach should be used along with diabetes self-management education, patient empowerment and lifelong management programs to improve diabetes-related outcomes and quality of life.^{li}

Yoga and Meditation

Assessment of psychiatric illness such as assessment of anxiety, depression has to be considered. Yoga and meditation help in relaxation of mind.

Conclusion:-

In some reports, psychological factors such as self-efficacy,^{lii} self-esteem,^{liii} diabetes coping^{liv} and social support^{lv} were found to be associated with good treatment adherence and glycemic control; whereas factors such as stressful life events,^{lvi} daily environmental stressors,^{lvii} and diabetes-related distress^{lviii} were associated with poor glycemic control and nonadherence to treatment. The screening of adolescents with type 1 Diabetes for mental health issues should be incorporated in their regular clinical follow ups so that these morbidities can be detected at the earliest and prompt actions can be attempted for their prevention.

ⁱ Kovacs M, Ho V, Pollock MH. Criterion and predictive validity of the diagnosis of adjustment disorder: a prospective study of youths with new-onset insulin-dependent diabetes mellitus. *Am J Psychiatry* 1995;152(4):523-8.

ⁱⁱ Grey M, Cameron ME, Lipman TH, Thurber FW. Psychosocial status of children with diabetes in the first two years after diagnosis. *Diabetes Care* 1995;18(10):1330-6.

ⁱⁱⁱ Delamater AM. Psychological care of children and adolescents with diabetes. *Pediatr Diabetes* 2009;10(Suppl 12):175-84.

^{iv} Corbett T, Smith J. Exploring the effects of being diagnosed with type 1 diabetes in adolescence. *Nurs Stand* 2020;35:77-82.

^v Felner EI, Klitz W, Ham M, Lazaro AM, Stastny P, Dupont B, White PC. Genetic interaction among three genomic regions creates distinct contributions to early- and late- onset type 1 diabetes mellitus. *Pediatr Diabetes* 2005, 6:213-220.

^{vi} Kalra S, Jena BN, Yeravdekar R. Emotional and Psychological Needs of People with Diabetes. *Indian J Endocrinol Metab.* 2018 Sep-Oct;22(5):696-704.

- ^{vii}Rechenberg, K., Whittemore, R., & Grey, M. (2017). Anxiety in Youth With Type 1 Diabetes. *Journal of pediatric nursing*, 32, 64–71.
- ^{viii}Reynolds, K. A., & Helgeson, V. S. (2011). Children with diabetes compared to peers: depressed? Distressed? A meta-analytic review. *Annals of behavioral medicine: a publication of the Society of Behavioral Medicine*, 42(1), 29–41.
- ^{ix}Hislop AL, Fegan PG, Schlaeppli MJ, Duck M, Yeap BB. Prevalence and associations of psychological distress in young adults with Type 1 diabetes. *Diabet Med* 2008;25:91-6.
- ^xSeiffge-Krenke I, Klessinger N. Long-term effects of avoidant coping on adolescents' depressive symptoms. *J Youth Adolesc* 2000 ;29:617 -30doi: 10.1023/A:1026440304695
- ^{xi}Kovacs M, Ho V, Pollock MH. Criterion and predictive validity of the diagnosis of adjustment disorder: a prospective study of youths with new-onset insulin-dependent diabetes mellitus. *Am J Psychiatry* 1995;152(4):523-8.
- ^{xii}Grey M, Cameron ME, Lipman TH, Thurber FW. Psychosocial status of children with diabetes in the first two years after diagnosis. *Diabetes Care* 1995;18(10):1330- 6.
- ^{xiii}Martínez Chamorro MJ, Lastra Martínez I, Luzuriaga Tomás C. Perfilpsicosocial de niños y adolescentes con diabetes mellitus. *Boletín de la Sociedad de Pediatría de Asturias, Cantabria, Castilla y León* 2002;42:114-9.
- ^{xiv}Rechenberg, K., Whittemore, R., Holland, M., & Grey, M. (2017). General and diabetes-specific stress in adolescents with type 1 diabetes. *Diabetes research and clinical practice*, 130, 1–8
- ^{xv}Grey M, Whittemore R, Tamborlane W. Depression in Type 1 diabetes in children Natural history and correlates. *Journal of Psychosomatic Research*, 2002; 53; 907– 911
- ^{xvi}Goldston DB, Kelley AE, Reboussin DM et al. Suicidal ideation and behaviour and noncompliance with the medical regimen among diabetic adolescents. *J. Am. Acad. Child. Adol. Psychiatry* 36(11), 1528–1536 (1997).
- ^{xvii}Maronian S, Vila G, Robert J, Mouren-Simeoni M. Troubles DSM-IV, quilibremetabolique et complications somatiques dans le diabete insulin dependant de l'enfant et de l' adolescent. *Ann. Medico Psychologiques* 157, 320–331 (1999).
- ^{xviii}Hassan K, Loar R, Anderson BJ, Heptulla RA. The role of socioeconomic status, depression, quality of life, and glycemic control in Type 1 diabetes mellitus. *J. Pediatr.* 149(4), 526–531 (2006).
- ^{xix}Chew BH, Shariff-Ghazali S, Fernandez A. Psychological aspects of diabetes care: Effecting behavioral change in patients. *World J Diabetes* 2014, 5: 796-808.
- ^{xx}Khandelwal S, Sengar GS, Sharma M, Choudhary S, Nagaraj N. Psychosocial illness in children with Type 1 Diabetes Mellitus: Prevalence, pattern and risk factors. *J Clin Diagn Res* 2016, 10: 5-8.
- ^{xxi}Guthrie DW, Bartsocas C, Jarosz-Chabot P, KOnstantinova M. Psychosocial issues for children and adolescents with diabetes: overview and recommendations. *Diabetes Spectrum* 2003;16:7-12.
- ^{xxii}Gupta N, Bhadada SK, Shah VN, Mattoo SK. Psychological aspects related to diabetes mellitus. *J Diabetes Res* 2016, 2016: 7276403.
- ^{xxiii}Goldston DB, Kovacs M, Ho VY, Parrone PL, Stiffler L. Suicidal ideation and suicide attempts among youth with insulin-dependent diabetes mellitus. *J Am Acad Child Adolesc Psychiatry* 1994;33:240–6
- ^{xxiv}Winston AP. Eating disorders and diabetes. *Current Diabetes Reports*. 2020 Aug;20(8):1-6
- ^{xxv}Farabi SS. Type 1 diabetes and sleep. *Diabetes Spectrum*. 2016 Feb 1;29(1):10-3.
- ^{xxvi}Graber, A. L., Brown, A. W., & Wolff, K. (2010). *A life of control: stories of living with diabetes*. Nashville, Tennessee: Vanderbilt University Press.
- ^{xxvii}Khandelwal S, Sengar GS, 9harma M, Choudhary S, Nagaraj N. Psychosocial illness in children with type 1 diabetes mellitus: prevalence, pattern and risk factors. *Journal of clinical and diagnostic research: JCDR*. 2016 Sep;10(9):SC05.
- ⁵⁸Riaz M, Basit A, Fawwad A, YakoobAhmedani M, Ali Rizvi Z. Factors associated with non-adherence to insulin in patients with type 1 diabetes. *Pak J Med Sci*. 2014 Mar;30(2):233–9.
- ^{xxix}Kumar KM. Incidence trends for childhood type 1 diabetes in India. *Indian journal of endocrinology and metabolism*. 2015 Apr;19(Suppl 1):S34.
- ^{xxx}Delamater AM, de Wit M, McDarby V, Malik J, Acerini CL (2014) ISPAD clinical practice consensus guidelines 2014. Psychological care of children and adolescents with type 1 diabetes. *Pediatr Diabetes* 15(Suppl20):232– 244.
- ^{xxxi}Jensen PS, Goldman E, Offord D, Costello EJ, Friedman R, Huff B, Crowe M, Amsel L, Bennett K, Bird H, Conger R, Fisher P, Hoagwood K, Kessler RC, Roberts R (2011) Overlooked and underserved: “action signs” for identifying children with unmet mental health needs. *Pediatrics* 128(5):970–979.

- ^{xxxii}Sahithya BR, Raman V. Psychosocial issues in Type 1 Diabetes Mellitus-A review and proposal of a model for evaluation and management in the Indian context. *Journal of Indian Association for Child and Adolescent Mental Health-ISSN 0973-1342*. 2019 Jan 1;15(1):85-109.
- ^{xxxiii}Chatterjee S, Biswas P. Psycho-social stigma among type 1 diabetes mellitus patients. *Indian Journal of Medical Specialities*. 2013 Jan 1;4(1).
- ^{xxxiv}Marshall M, Carter B, Rose K, Brotherton A. Living with type 1 diabetes: perceptions of children and their parents. *J Clin Nurs*2009;18:1703-10.
- ^{xxxv}Frank MR. Psychological issues in the care of children and adolescents with type 1 diabetes. *Paediatr Child Health* 2005;10:18-20.
- ^{xxxvi}Helgeson VS, Reynolds KA, Siminerio L, Escobar O, Becker D. Parent and adolescent distribution of responsibility for diabetes self-care: links to health outcomes. *J Pediatr Psychol* 2008;33:497- 508.
- ^{xxxvii}Lewin AB, Heidgerken AD, Geffken GR, Williams LB, Storch EA, Gelfand KM, Silverstein JH. The relation between family factors and metabolic control: the role of diabetes adherence. *J Pediatr Psychol*. 2006;31:174–183.
- ^{xxxviii}Pedersen MAM, Kristensen LJ, Sildorf SM, Kreiner S, Svensson J, Mose AH, Thastum M, Birkebaek N. Assessment of family functioning in families with a child diagnosed with type 1 diabetes: Validation and clinical relevance of the general functioning subscale of the McMaster family assessment device. *Pediatr Diabetes*. 2019;20:785–793.
- ^{xxxix}Hilliard ME, Wu YP, Rausch J, Dolan LM, Hood KK. Predictors of deteriorations in diabetes management and control in adolescents with type 1 diabetes. *J Adolesc Health*. 2013;52:28–34.
- ^{xl}Vaid E, Lansing AH, Stanger C. Problems With Self-Regulation, Family Conflict, and Glycemic Control in Adolescents Experiencing Challenges With Managing Type 1 Diabetes. *J Pediatr Psychol*. 2018;43:525–533.
- ^{xli}Rybak TM, Ali JS, Berlin KS, Klages KL, Banks GG, Kamody RC, Ferry RJ, Alemzadeh R, Diaz-Thomas AM Guest Editors: Cynthia A. Gerhardt, Cynthia A. Berg, Deborah J. Wiebe and Grayson N. Holmbeck. Patterns of Family Functioning and Diabetes-Specific Conflict in Relation to Glycemic Control and Health-Related Quality of Life Among Youth With Type 1 Diabetes. *J Pediatr Psychol*. 2017;42:40–51.
- ^{xliii}Drotar D, Ittenbach R, Rohan JM, Gupta R, Pendley JS, Delamater A. Diabetes management and glycemic control in youth with type 1 diabetes: test of a predictive model. *J Behav Med*. 2013;36:234–245.
- ^{xliiv}Zheng XP, Chen SH. Psycho-behavioral changes in children with type 1 diabetes mellitus. *World journal of Pediatrics*. 2013 Aug;9(3):261-5.
- ^{xliv}Young-Hyman D, de Groot M, Hill-Briggs F, Gonzalez JS, Hood K, Peyrot M. Psychosocial care for people with diabetes: A position statement of the American Diabetes Association. *Diabetes Care* 2016;39:2126-40.
- ^{xlvi}Sahithya BR, Raman V. Psychosocial issues in Type 1 Diabetes Mellitus-A review and proposal of a model for evaluation and management in the Indian context. *Journal of Indian Association for Child and Adolescent Mental Health-ISSN 0973-1342*. 2019 Jan 1;15(1):85-109.
- ^{xlvii}Gautam S. Fourth revolution in psychiatry – Addressing comorbidity with chronic physical disorders. *Indian J Psychiatry*. 2010;52(3):213-19
- ^{xlviii}Sridhar GR. Psychiatric comorbidity & diabetes. *Indian J Med Res*. 2007;125(3):311-20
- ^{xlix}Ismail K, Maissi E, Thomas S, et al. A randomized controlled trial of cognitive behavior therapy and motivational interviewing for people with type I diabetes mellitus with persistent sub-optimal glycemic control: A Diabetes and Psychological Therapies (ADaPT) study. *Health Techno Assess*. 2010;14(22):1-6.
- ^lMadhu K, Sridhar GR. Stress management in diabetes mellitus. *Int J Diab Dev Countries*. 2005;25:7-1
- ^{li}Sridhar GR, Madhu K. Stress in the cause and course of diabetes. *Int J Diab Dev Countries*. 2001;21:112-20.
- ^{lii}Ikeda K, Aoki H, Saito K, Muramatsu Y, Suzuki T. Associations of blood glucose control with self-efficacy and rated anxiety/depression in type II diabetes mellitus patients. *Psychol Rep* 2003;92:540-4.
- ^{liiii}Neck MC, Keinänen-Kiukaanniemi SM, Knuuttila ML, Syrjälä AM. Self-esteem as a characteristic of adherence to diabetes and dental self-care regimens. *J Clin Periodontol*2001;28:175-80
- ^{liiv}Mooy JM, de Vries H, Grootenhuys PA, Bouter LM, Heine RJ. Major stressful life events in relation to prevalence of undetected type 2 diabetes: The Hoorn study. *Diabetes Care* 2000;23:197-201
- ^{liv}Glasgow RE, Toobert DJ, Riddle M, Donnelly J, Mitchell DL, Calder D, et al. Diabetes-specific social learning variables and self-care behaviors among persons with type II diabetes. *Health Psychol* 1989;8:285-303
- ^{lvi}Aikens JE, Mayes R. Elevated glycosylated albumin in NIDDM is a function of recent everyday environmental stress. *Diabetes Care* 1997;20:1111-3.
- ^{lvii}Toobert DJ, Glasgow RE. Problem solving and diabetes self-care. *J Behav Med* 1991;14:71-86.