5. Discussion

The subsequent chapter argues in relation to the potential explanation and reasonable inferences that may conceivably be drawn from the analysis of the results. The discussion is elucidated with reference to the existing research literature presented under the sequential structure of phase 1 and 2.

The objectives of the present research are divided into two phases. The objectives of phase 1 was to explore the psychosocial, clinical and socio-demographic correlates of adherence; and psychosocial correlates of metabolic control that leads to diabetes self-management and to explore the contributing factors that predict adherence and nonadherence. Furthermore, to explore the perspectives and lived experiences of adolescents with type 1 diabetes and the perspectives of the parents of adolescents with type 1 diabetes.

The objectives of phase 2 was to develop and implement a psychoeducation module to improve adherence leading to effective self-management based on the significant correlates and predictor variables and to find the difference between experimental and control group after the implementation of the psychoeducation module in the experimental group.

5.1 Phase 1: Exploratory

5.1 A: Section A: Quantitative Analysis

5.1 A I) Descriptive analysis of sample characteristics

The information gathered from the sample has been described using percentage analysis under three sub-sections of socio-demographic, clinical and psychosocial characteristics. These three sub-sections together give an orientation of the main features of the information gathered from the sample.

i) Socio-demographic characteristics of the sample

This sub-section depicts the societal aspects of the sample which comprises of gender, residing place, age, socioeconomic status, number of siblings and qualification.
The characteristics of the population are demographics which serve in evaluating the nature in which population changes over time which can affect the society that is the social sphere wherein policies, contracts and strategies are developed in order to deal with the concerns of the population. Demographics of the present study are discussed below with reference to the findings that surfaced along with literature reviewed.

In the present research, majority of participants were girls (63%). Thus, it can be assumed that the incidence of type 1 diabetes is higher in girls. This result is consistent with research conceded by Kumar (2015) on “Incidence trends for childhood type1 diabetes in India” wherein the first population-based study of preponderance of insulin-dependent diabetes in South India demonstrated that insulin-dependent diabetes is higher as compared to numerous Asian countries. In addition, Results from Karnataka Diabetes Registry 1995-2008, listed type1 diabetes incidence of 4.0/100,000 in girls and 3.7/100,000 in boys over time span of thirteen years of gathering data, which was carried out by Kumar et al., (2008).

Slightly more than half of the sample size resided in semi-urban and urban place (52%). This finding of the present study is in concordance with study conceded by Kalra, Kalra, & Sharma (2010) on Prevalence of type 1 diabetes mellitus in Karnal district, Haryana State, India wherein the results stated a higher preponderance of type 1 diabetic population in urban (26.6/100,000) as compared to rural areas (4.27/100,000) in Karnal city, North India, with a population of 222017. The preponderance was calculated by several methods including central or national registries, surveys, hospital, school records in various age groups. However, this data can be extended to the country as it embraces implications for service providers and stakeholders in the area of diabetes since economy of the country can play a vital role in gauging the preponderance of the disorder.

Most of the adolescents in the present study are 15 years old (21%) and majority assimilate in the age-range of 15-18 years. Thus, it becomes crucial for adolescents to achieve metabolic control as it has been investigated that adolescence is a transitional stage which is often linked with decline in metabolic control which is attributed to irregular exercising and meal, reduced adherence to management, hazardous actions, eating disorders and changes in the endocrine system related to pubertal changes that can lead to larger resistance of insulin. Therefore, the decreased metabolic control leads to
development of vascular complications such as retinopathy, nephropathy or neuropathy (ISPAD Clinical Practice Consensus Guidelines 2009 Compendium; Amutha, Thai, & Viswanathan, 2013; Weissberg-Benchell, Wolpert, & Anderson, 2007; Diabetes Control and Complications Research Group, 1994).

The preponderance of participants belonging in the bracket of underprivileged standing is as high as 74%. Underprivileged is linked with disadvantaged cohort in the area of self-care wherein there is malnutrition, lack of nutritious and dietary supplements which can lead to undernourishment. This finding can be allied with research carried out by Moulik, Jayashree, Singhi, Bhalla, & Attri (2012) which position diabetic ketoacidosis in children as an important cause of morbidity and mortality and malnutrition increases the risk of diabetic ketoacidosis related complications such as low blood sugar, low potassium levels which can adversely affect heart, nerve activities or can produce swelling in the brain.

In the present study, most of the participants have one sibling (53%). This finding can be associated with research study carried out by Pociot, & McDermott (2002) which links genetics as one of the possible causal contributory factors of type 1 diabetes mellitus and shows that sisters and brothers of children having type 1 diabetes stand a higher possibility of developing the disorder which is 0.4% in general population v/s 6% in siblings among the relatives of those having type 1 diabetes. Thus, this finding can be utilized as a caution and the siblings of the individual with type 1 diabetes health condition can have regular check-up or be informed of the predisposing factors of the disorder in order to recognize the early signs of illness.

A larger section of the sample are either school or college dropouts (86%) in the present research. This result can be supported with the findings above which classify majority of the sample as underprivileged, deducing that financial restraint is a probable causal factor as they have to earn to provide support to themselves and their families. In addition to this probability, another cause can be the disorder itself since managing its demands such as taking insulin timely, monitoring blood sugar levels and being alert of hypoglycaemia and hyperglycaemia, can consume the time of the adolescents. However, there had been a research study that attempted to link chronic disease with dropping out of school in the United States in 2014 by Vaughn, Salas-Wright and Maynard, for which the data was gathered from 2006-2010 and the results revealed that health condition of
diabetes was positively correlated with school drop-outs across three ethnic groups of Whites, African-Americans and Hispanics. The sample in the literature study were scrutinized on self-perception of health which was rated poor by all the three ethnic groups and perception includes the burden of illness, risky health behaviours and life-expectancy.

**ii) Clinical characteristics of the sample**

The clinical information sought for the present study was gathered from the clinical documents of the patients after seeking approval from the Ethics Committee. The information attained helps in making decisions for the patient’s physiological concerns. The obtained information is presented below and discussed with reference to the findings of the current study and in the light of existing literature.

Maximum participants had the onset of type 1 diabetes at the age of 12 years (16%) and the age-range of 7-12 years (65%) is the peak age of onset of type 1 diabetes mellitus. This result can be supported with information from Diabetes Atlas, 2013 which states that worldwide, approximately 78,000 children under 15 years of age develop type 1 diabetes mellitus. Also, research carried out in India, by Kumar (2015) titled “Incidence trends for childhood type 1 diabetes in India” stated that peak age at diagnosis of type 1 diabetes was 12 years which can be corroborated with the present study.

Majority of the participants (79%) had family history of diabetes which consists largely of type 2 diabetes. However, research literature states that type 2 diabetes is inherited in part and the first degree relatives of type 2 diabetic individuals are thrice more liable to develop the disease than those who do not have family history of diabetes (Flores, Hirschhom, & Altshuler, 2003; Hansen, 2003; Gloyn, 2003) whereas first rank relatives of type 1 diabetic mellitus individuals are 6% more likely to develop diabetes compared to 1% in general population (Dorman, & Bunker, 2000).

In the current research, only 22% of participants showed co morbidity of diabetes with other medical conditions such as retinopathy, thyroid and nephropathy. This finding can be sustained along with DiabCare Asia-India Study which addresses the current status of diabetes care in India by Raheja et al., (2001), wherein data from 2269 subjects having type 2 diabetes in urban Indian diabetes population, it was revealed that more than 54% of
the patients have complications related to diabetes since the A1C was considerably higher than the levels recommended by Indian Council of Medical Research and American Diabetes Association which eventually lead to development of diabetes associated complications such as neuropathy, retinopathy, difficulties related to heart and feet; and the incidence of complications increased with longer period of having diabetes.

Majority of the participants (66%) followed the three meal plan in the present study. This finding is usually related to the insulin routine which comprises of three to four injections of insulin each day which must be timed along with meals so that glucose is effectively entered into the system of the individual which eventually leads to controlled glucose levels that can improve diabetes management. However, it is imperative that the adolescents maintain their meal timings since they can get busy with their social schedules or activities and also go through fluctuations in mood due to pubertal changes as they are in the transitory phase of development (American Diabetes Association, 2009).

There is higher prevalence of intermediate control followed by poor control of glycosylated haemoglobin (39%+35%) in the present sample. This finding is consistent with the results obtained in the current research study wherein adolescents are cohort of the study who are undergoing the transition from childhood to early adulthood wherein different hormones may lead to sensitivity in insulin which in turn leads to demand for rise in doses on insulin and deterioration in metabolic control (Acerini, Williams, & Dunger, 2001). Besides, majority of the sample is classified in the underprivileged category wherein the economical challenge of malnutrition subsists and adjustment of blood glucose level depends on what an individual eats along with the quantity that is eaten and the hygienic environment maintained for living which can keep illness at bay.

In a study carried out in India, by Puri, Sapra, & Jain (2013), it was unveiled that having elevated levels of blood glucose and being in the bracket of lower socio-economic status along with having the onset of type 1 diabetes at an older age, it would increase the prevalence of developing cognitive and psychological problems which lead to poor emotional well-being which in turn lead to lesser control of the health condition.

Most of the participants in the present research have type 1 diabetes since one year (14%) followed by three years (13%). Since type 1 diabetes mellitus is a lifelong health
condition, it is imperative to manage it effectively to avoid vascular complications. As an individual grows and observes changing external and internal environment such as increase in age accompanied by developmental changes, there is a probability that the intensity of managing the health condition may be due to influence of mood, perception of support received, low or high blood sugar level, absenteeism from exercising, missing clinic appointments or disobedience from eating plans and skipping injections. Therefore, the individuals afflicted with the health condition of diabetes need to become aware of the consequence of slight negligence and they have to be empowered to manage diabetes by understanding the effect of clinical management on which their survival depends along with psychosocial management which can help them in identifying the motivational factors that lead to adherence of management (Virtual Labs, Stanford University, 2005; Funnel, & Anderson, 2004).

### iii) Psychosocial characteristics of the sample

Majority of the participants in the present research study demonstrate lower adherence (56%), to tasks related to diabetes management. These tasks comprise of monitoring their blood glucose levels, eating appropriate meals at appropriate times, engaging in physical activities such as exercising, visiting the clinic for appointments with the doctor regularly, having awareness about adjusting insulin dosage and what to do in case of hypoglycaemia and hyperglycaemia along with maintaining a record of blood glucose levels and the nature of food consumed. It has been found that patients having type 1 diabetes enormously benefit if they follow the steps of self-care related to managing diabetes (American Diabetes Association, Standards of Medical Care in Diabetes, 2009; Odegard, & Capoccia, 2007).

Nonetheless, literature studies reveal that compliance in management is lacking and a research study has demonstrated that only 30% of patients with type 1 diabetes comply to the prescribed regimen due to variety of social factors such as the pricing and the availability of the medicines, the feasibility of carrying it with oneself and administering it (Kesavadev et al., 2014).

It can be concluded that routinely and scheduled adherence to the regimen can assist in glycemic control or else performing fewer blood glucose monitoring, facing anxiousness
due to frequency of insulin injections and skipping exercise can result in poor control of blood glucose level (Berlin et al., 1997). Since adherence has a noteworthy contribution to the treatment outcome of diabetes, having poor adherence can lead to worse blood glucose levels and associated diabetic complications.

A large number of the participants (86%) reported higher self-esteem in the current study. Self-esteem is the sense of one’s worth that each individual possesses which leads to having either a negative or positive point of reference of oneself. In the present study, self-esteem is measured by Rosenberg’s self-esteem scale which assesses the trait of self-esteem, constructing it as a relatively stable feeling that can lead to forecasting the behaviour of the individual. Thus, higher score in this scale is interpreted to having a positive link with social-acceptance, confidence and negative connection with low self-worth, rejected feeling (Blascovich, & Tomaka, 1991). Thus, most of the participants indicate having a positive self-worth and confidence. This construe is parallel to the investigator’s perspective during the phase of gathering data wherein observation was made that few of the patients would either come alone to the hospital for the doctor’s appointment or would come with a friend, relative or a neighbour which can be assumed as an indicator of their confidence and probably the responsibility to manage their health condition.

In a study carried out by Sultana in India (2007), it was found that most of the children with insulin dependent diabetes mellitus, between the age-range of 6-15 years report significantly lower self-esteem as compared to children without type 1 diabetes and the reasons are attributed to defensiveness, embarrassment and being uncomfortable with their health condition. Thus, providing these children training in social skills and psychoeducation, their coping ability would enhance which would enable them to accept their health condition. However, the participants who report lower self-esteem can be given these suggested measures as proposed by the literature in order to enhance their acceptance of the health condition and increase their self-worth.

An equal percentage of participants report experiencing emotional burnout specifically due to diabetes and feeling distressed due to diabetes. Thus, feeling overwhelmed due to the complicated and continuous medical regimen, increases the likelihood of experiencing burnout and distress with ‘feeling that diabetes is taking up too much of physical and
mental energy daily’ and ‘lack of energy’. Hence, the afflicted individual with diabetes related emotional distress may be low on motivation and high on frustration. In a study carried out by Casalenuovo (2002), on 87 type 1 and type2 diabetic adults, it was indicated that well-being was disrupted along with depletion in energy and experiencing mental and physiological fatigue due to stress of having to live with diabetes (Polonsky et al., 1995, 2005).

There is a moderate level (43%) of emotional distress which includes depression and anxiety, indicated by the participants in the present study and there is high preponderance (57%) of lower psychological morbidity in the participants demonstrating that there is a moderate departure from the state of physical and psychological welfare which is a consequence of illness particularly where the affected individual is conscious of their condition. The state of departure is characterised by depression, anxiety, hypochondriasis or withdrawal from the social sphere. This reasonable intensity of anxiousness and despair can almost certainly be triggered by the regimen of managing diabetes which is a round the clock treatment that has to be ritually carried out every day without missing any aspect involved in it which is crucial especially for patients with type 1 diabetes mellitus. Research conceded in France wherein the cohort were type 1 diabetic patients only, shows that anxiety and phobic symptoms are found in more than 90% of the patients who are on insulin therapy (Berlin et al., 1997).

In a survey carried out by Peyrot et al., (2005) in 13 countries in Asia, Australia, Europe and North America, the purpose was to study DAWN- Diabetes Attitudes, Wishes and Needs; the survey revealed that 33% of type 1 diabetic patients were fearful of insulin injections and above 20% of the patients had to motivate themselves before taking each injection. Therefore, the fear and convincing oneself each time to perform the same routine based task multiple times per day can lead to feelings of uneasiness and sadness.

Majority of the participants (61%) report belonging to a family with higher level of dysfunction wherein there is higher preponderance of conflict, delinquency, there is no discipline practiced and miscommunication. The present research study also points towards lower adherence in the participants with decreased metabolic control. This can however be corroborated with former research carried out by Anderson et al. (2002) wherein 104 children and adolescents with type1 diabetes belonging to the age range of 8-
17 years were examined along with their parents on diabetes conflict scale, diabetes family responsibility questionnaire and glycemic control. The results revealed that involvement of parents which can either be negative or positive involvement emerges as a significant predictor of adherence of monitoring blood glucose levels and in families where diabetes conflict was high, the glycemic control was poor.

Most of the participants (58%) perceive lower social support from family, friends and significant others such as a best friend or a noteworthy neighbour. Research studies suggest that a supporting caregiver can act as a buffer to families that encounter stressors from multiple sources (Ellis et al., 2007). Research carried out by Carcone et al., (2012) on 141 adolescents’ show that during adolescence, with increase in autonomy, the support received from parents is decreased which is linked to poor management of illness whereas there was no association that could be established between support from friends and peers with good diabetes care.

Most of the participants (64%) have a higher coping orientation to overcome any difficulties they encounter. These strategies include use of humor, seeking professional help or spiritual support. In a research carried out by Pisula and Czaplinska (2010) which utilised the same coping scale as in the present research study. The research was executed with 51 adolescents having type 1 diabetes in the age range of 12-17 years and 56 healthy adolescents, it was ascertained that adolescents having diabetes utilised ‘seek professional help’ more than the healthy adolescents comparative group adolescents and girls who had diabetes indicate a higher use of ‘investing in close friends’. The adolescent girls in the control group utilised ‘seeking social support’, ‘relaxing’ and ‘seeking diversions’ as coping orientation. There is a higher prevalence of participants stating that they have an enhanced health related quality of life which encompasses social, physical, mental and emotional functioning. In a study carried out by Puri, Sapra, & Jain, 2013, 49 children between the age range of 6-18 years were assessed on quality of life and results revealed that early onset of diabetes was associated with better quality of life and an optimistic outlook of life.

Majority of the participants (56%) have higher cognitive appraisal specifying that they are able to give individualistic interpretation and evaluate the state of affairs in reference to personal interests and half of the sample (51%) report low expressive
suppression which yields that they can articulate what they feel. Zeman (2003) reports that by the conclusion of childhood and commencement of adolescence, the ability to regulate and express emotions in a refined manner is developed. Three main influencing factors on adolescent’s emotional growth are hormonal changes, development of cognition and life events (Rosenblum, & Lewis, 2003). Thus, being diagnosed with diabetes which is a chronic lifelong disorder that requires lifestyle modifications is associated to a significant life event. In the adolescence developmental phase in which they are experiencing internal as well as external changes, their capability to regulate emotions and express their feelings is impacted with the onset of diabetes as they become increasingly sensitive of appraisal from their peers, friends and family.
5.1 A II) Inferential Analysis

i) Analysis of relationship between adherence and psychosocial variables

The psychosocial characteristics assessed in the current research gives an understanding of the dynamic interface of the social and psychological functioning of the individuals that facilitates in investigating personal, professional, societal and familial influences with adherence to the diabetes regimen. Thus, identifying the emotional issues of type1 diabetes adolescence group can lead to proposing an intervention related to psychosocial aspects which can serve in improving the emotional outcome by receiving resources that can provide support and well-being (Cardoso, & Chronister, 2009).

The analysis of relationship between adherence and psychosocial variables namely emotional distress which combines anxiety and depression, diabetes related emotional distress, family functioning, emotional regulation which includes cognitive appraisal and expressive suppression, self-esteem, psychological morbidity, coping strategies, perceived social support and health related quality of life were tested through the bivariate correlational tool of Spearman’s rho to find out whether there is a statistically significant relationship between adherence and either or all of the psychosocial variables.

It was hypothesised that there would not be a statistically significant relationship between adherence and either of the psychosocial variables. However, this hypothesis was compelled to be rejected because the test found that diabetes related emotional distress ($r_s = -.35, p < 0.01.$), family functioning ($r_s = .32, p < 0.01.$), behavioural control in family functioning ($r_s = .37, p < 0.01.$) and communication in family functioning ($r_s = .24, p < 0.05.$) had a statistically significant relationship with adherence. On the other hand, the test did not find a statistically significant relationship of adherence with emotional regulation that comprised cognitive appraisal and expressive suppression, self-esteem, psychological morbidity, emotional distress which combined anxiety and depression, coping orientation, perceived social support and health related quality of life. The plausible explanations for the same, in view of the existing research literatures have been presented beneath each variable specifically.
Family functioning and adherence

In the present research, family functioning has been indicated as a significant variable that is positively correlated with adherence along with its two components of communication and behavioural control. Thus, revealing that the structure and organization of the family group along with the transactional contact among members of the family and properties that differentiate the family between unhealthy and healthy conceptualises family functioning. The significant components that have surfaced in family functioning are, firstly, communication which is explained as the approach in which members of the family exchange information clearly in relation to the content of the message and whether it is verbal or non-verbal or is the message directed at the person for whom it is intended or is it indirectly delivered to the person.

Secondly, behavioural control depicts the way in which the family sets certain standards of behaving in certain situations and upholds it. The family further sets guidelines of behaving in a social gathering, in emotional, emergency or dangerous circumstances such as having clear guidelines about toilet habits, in case something goes wrong in the family, if an emergency situation arises or if a family member is hit by another family member. In addition, behaviour in different situations are assessed through varied patterns of control such as rigid actions are taken as a consequence, either there is flexibility, barter system or it is chaotic wherein each member does what they desire by not following the rules such as surpassing or flouting rules after doing a mistake.

This can be corroborated with the existing research literature wherein several research findings have illustrated that family dynamics have an important contribution in managing of diabetes in children. Numerous prospective and cross-sectional research shows that higher level of cohesion in the family, authoritative style of parenting and distribution of responsibilities related to managing diabetes, support offered within the family and cooperative problem solving behaviour are all related to betterment in adherence of regimen as well as improved metabolic control whereas disagreements and arguments in the family has been related with worsening in adherence of regimen and poorer glycemic control. Also, the research shows if there is a collaborated relationship involving the youth with their parents regarding sharing of responsibilities in managing diabetes, it is not only associated with enhanced adherence to regimen but also better
emotional functioning. However, significant association of diabetes ketoacidosis which is a result of negligent behaviour in following the treatment, with dysfunctional family which is characterized with conflict and misunderstandings has been found (Tsiouli, Alexopoulos, Stefanaki, Darviri, & Chrousos 2013; Miller-Johnson et al., 1994; La Greca et al., 1995; Anderson, Ho, Brackett, Finkelstein, & Laffel, 1997; Davis et al., 2001; Wysocki et al., 2008; Helgeson, Reynolds, Siminerio, Escobar, & Becker, 2008; Wysocki et al., 2009; Cameron et al., 2008; Hilliard, Holmes, Chen, Maher, Robinson, & Streisand, 2013; Sood et al., 2012; Rohan et al., 2014). Yet, one large-scale study showed that behavioural family systems therapy led to improved parent-child relationships and adherence, but not improved glycemic control among adolescents with type 1 diabetes (Wysocki, Greco, Harris, Bubb, & White, 2001).

**Diabetes related emotional distress and adherence**

In the present study, it has been illustrated that adherence is inversely significant with diabetes related emotional distress and has a strong relationship indicating that adherence increases when diabetes related emotional distress decreases. Thus, concepts akin to feeling depressed or anxious due to having diabetes, social support and coping orientation contribute to emotional distress specifically related to diabetes. In addition, health beliefs associated with diabetes such as feeling scared about the thoughts of living with diabetes, feeling guilty or developing anxiousness when the diabetes regimen is not followed and not having accurate goals regarding diabetes care are characteristics of diabetes related emotional distress.

The findings of the present study can be corroborated with former research studies by Polonsky and associates (1995) on 451 type 1 diabetic female patients who reported that diabetes related emotional distress is a chief contributor of poor adherence. In another study conducted by Hains, Berlin, Davies, Parton, & Alemzadeh (2006) which included 104 type 1 diabetic adolescents concluded that diabetes related stress impact adherence which is associated with poor metabolic control. This can be corroborated with the descriptive data of the present research study which indicates that 56% of the adolescents have low adherence in following the regimen related to diabetes management which can potentially be the outcome of diabetes specific emotional distress experienced by the participants.
Self-esteem and adherence

In the present research study, self-esteem was not found to have a statistically significant relationship with adherence, pointing out that self-esteem is independent of adherence and whether the regimen of self-care is followed or not, it has no association with one’s self of worth or the confidence in their abilities. This result is not corroborated with former research carried out by Rubin (1968) which posits that self-esteem of a child could be challenged with the onset of a chronic illness and it is closely related to the child’s ability to master management in relation to parts of the body as well as body functions. Since diabetes can adversely affect the organs and functioning of the body, it becomes important to consider that consistent and routinely adherence can help in achieving a normal glycemic control which may possibly serve in keeping diabetes associated complications at a distance that can maintain the body parts and functioning in good shape. Jacobson (1996) recognised common psychosocial issues related to diagnosis of diabetes which involves initially feeling angry, loss and grief on the part of the affected individual and family. These issues faced can lead to decreased self-esteem along with lower academic achievement.

Coping and adherence

The present research study suggests that coping orientation does not have a statistically significant relationship to adherence which can be contrasted with a study from the past carried out by Hanson et al. (1989) which stated that maladaptive styles of coping had a larger role in predicting poorer adherence to the treatment regimen rather than the factor of adolescent age since adolescence is the developmental period where problems are associated with decreased adherence. This includes anxiety and depression along with the emotional burden of having to live with diabetes throughout life and the feeling that diabetes overpowers one’s life. Further research must be continued to identify the factors that can enhance the level of adherence from low to high. Descriptive data of the present study indicates that 64% of the adolescents have a higher coping orientation to resolving challenges faced in their daily life, thus suggesting that the adolescents have the ability to cope with challenges. Therefore, it can be recommended that assessing their social and psychological adaptation specifically relating to diabetes management in the context of self-care can possibly improve adherence.
Health related quality of life and adherence

In a former study, in broad-spectrum, the quality of life rated by children having diabetes was alike to those rated by healthy peers (Nieuwesteeg et al., 2012). In the present research study, 58% adolescents in the cohort who belong to an underprivileged socioeconomic status have reported a higher health related quality of life. This research information can be contrasted with previous researches where boys tend to state better quality of life along with youth who have had diabetes for a longer duration and who hail from a better socioeconomic status. Also, modest evidence suggests that better quality of life has been associated with better metabolic control (Nieuwesteeg et al., 2012; Wake, Hesketh, & Cameron, 2000; Hassan, Loar, Anderson, & Heptulla, 2006; Froisland et al., 2013; Hilliard et al., 2013; Sand, Kljajic, Schaller, & Forsander, 2012).

Perceived social support and adherence

The findings of the present research study indicates adherence is not associated with perceived social support from friends, family and significant others which are inconsistent with former studies that observe social support perceived from family has been primarily focused for adolescents having diabetes. Studies have also illustrated that having a cohesive and supportive family enhances disease management as well as metabolic control since parents are involved in transferring the responsibility to their children. The manner of parental involvement such as taking decisions, performing responsibilities and communicating can assist health professionals also as for instance; it can enhance the regimen prescribed by medical health professionals. Adolescents also verify that parents are more supportive in helping them with tasks related to managing their disease than their friends (Hanna, & Guthrie, 2003). Former studies have accounted that social support received from family members especially parents holds an important place for children and adolescents who have type 1 diabetes. In a research study, it was seen that elevated support from family members for managing diabetes and taking care improved the regimen adherence in youngsters. In addition to these findings and in erstwhile research studies conceded, it was also observed that the intensity of family support received specially for diabetes care had an inverse relationship with the age of the youngster wherein older adolescents and children stated receiving lesser family support concerning diabetes. In this developmental phase, youth may probably receive emotional support from their friends and instrumental support by family.
However, the need to become autonomous in the adolescence stage and the fear of being stigmatized may possibly be the chief barriers that withhold the adolescents from receiving the required support (La Greca et al., 1995; Peters, Nawijn, & van Kesteren, 2014; Malik, & Koot, 2011, 2012; La Greca, & Bearman, 2002). Thus, when negative peer reactions are attributed to self-care by youth, there is a higher probability of decreased adherence to the regimen and increase in stress caused due to diabetes which ultimately leads to worse glycemic control (Hains et al., 2007). Thus, this can be linked with the findings of the present study in which 58% of the cohort of the current study who are adolescents indicate receiving lesser social support from their family, friends and significant others and the statistics also indicates that majority in the cohort have intermediate and poor glycemic control. The possible factors directing this result can be the transitional period of adolescence and the changing nature of relationships with parents, family members and peers.

**Emotional distress, psychological morbidity, emotional regulation and adherence**

Furthermore, the findings of the present research study indicated that emotional distress which encompasses anxiety and depression, psychological morbidity which incorporates hypochondriasis and social impairment and emotional regulation, has not established a statistically significant relationship with adherence. These test findings are inconsistent with the active contemporary literature in which a study conceded by Moussa et al. (2005) in Kuwait in which it was yielded that the three indices of emotional distress, namely anxiety, depression and total distress were significantly higher in children and adolescents who had type 1 diabetes compared to those without diabetes. These cognitive variables assessed are found independent of adherence which is contradictory with the literature that states that adolescents with diabetes emerge to be notably at risk for developing depression especially one episode of depressive disorder or anxiety before entering into adulthood (Kovacs, Obrosky, Goldston, & Drash, 1997; Lawrence et al., 2006). The component of social impairment of psychological morbidity is indicated as independent of adherence and has not been corroborated with research carried out by Lehmkuhl, et al. (2009) which reports that the youth feels diabetes care regimen is an interference in their social activities since it makes them appear different from peers as stated by 31% of youth in a qualitative study, sample size of 14, the regimen also interrupted their activities and their participation with friends when they wanted to eat out.
with them. A former research by Delamater, Smith, Kurtz and White (1988) also found adolescents reporting higher difficulty in adhering to treatment regimen in social circumstances which involved peers. These studies are in contrast with a literature research suggesting that support from peers can improve the adjustment to chronic illness as well as adherence to the treatment recommendations (La Greca, & Bearman, 2002).

It was observed that the two components of emotional regulation, namely cognitive appraisal and expressive suppression were not found to be statistically significantly related with adherence. Therefore, the ability to provide a distinctive interpretation and appraise a condition in reference to personal interests in addition with the suppressing emotions or not communicating feelings has been indicated as being independent from adherence or the obedience of following a regimen. However, this result too has been inconsistent with the research findings from other studies that state that cognitive reappraisal was linked with elevated self-esteem, self acceptance, coping strategies, improved interpersonal relationships and enhanced autonomy and the ability to master the environment whereas expressive suppression was completely inverse (Gross, & John, 2003). The explanation of this result can possibly be the scale employed to assess adherence and emotional regulation in participants, which were self-report measures, thus the information is gathered only from the adolescents which can probably determine room for social desirability on their part.
Conclusion

However the plausible reasons for results attained in the present research study and its inconsistency with existing literature may be attributed to the data gathered which includes only the adolescents self-reports that can serve in disclosing their perceptions about their health condition, family and self alongside the transitional developmental phase to which they belong presently. Thus, health professional can be persuaded to utilise these scales or others on a usual basis to understand and discover the areas in which they can become skilled to independently adhere to their regimen and where intervention can be offered.

Hence, as the ISPAD (2000) Consensus Guidelines have stated that diabetes care and its management is importantly influenced by psychosocial factors and have recommended that psychologists and social workers must be participate in the interdisciplinary team for health care, the psychological issues faced by individuals affected with diabetes and their families must be supported and attended by mental health care professionals and the core team that takes care of diabetes should be trained in recognising, identifying and offering information on the challenges related to the psychological aspects in managing diabetes. Therefore, in the present research, the identification of the psychosocial factors influencing adherence to diabetes regimen can be attuned with these established guidelines and in providing education to the patients and their family members regarding the psychological issues that can affect health management, provide counselling and psychological therapy sessions which can address their concerns or a psychological problem identified during assessment.
ii) Analysis of relationship between adherence, clinical and socio-demographic variables

The relationship between adherence and psychosocial variables cannot be observed in isolation; therefore the clinical and socio-demographic variables were taken in account. For instance, as the duration of the health condition increases, the age also increases thereby transiting the adolescents into young adults and making them independent in self-care. Thus, correlations were drawn with age, number of siblings, age of onset of diabetes, duration of diabetes, metabolic control (HbA1c) and weight. The result of the Spearman correlation coefficient test did not find a statistically significant relationship between either of the clinical and socio-demographic variables and adherence. Thereby the hypotheses stating that there is no relationship between adherence and clinical variables; and adherence and psychosocial variables are accepted.

Metabolic control which is measured by the glycosylated haemoglobin level is considered as the gold standard of measurement of diabetes control (Landgraf, 2006). Adhering to the medical regimen and maintaining metabolic control is the primary goal of diabetes management and if the patient volunteers to willingly obey the prescribed behavioural regime, there will be enhanced health as the outcome (Johnson, 1995). A frequent supposition amid researchers and clinicians is that, there is a direct relationship between metabolic control and adherence, so as to metabolic control improves if adherence is improved (Johnson, 1998). Subsequently, it can be concluded that the patients who are not able to achieve a near normal metabolic control may be non-adherent to their medical regimen.

In the current study, it was suggested that there was no association between duration of the illness and adherence which is similar to the result concluded by Bennet-Johnson et al. (1992) that did not reveal an association of adherence with duration of the disease. Morris et al. (1997) reported that reduced adherence of taking insulin shots regularly was related to poor glycemic control. Not adhering to the scheduled regimen and stress have been related to decreased metabolic control as predicted in the investigation by Peyrot, McMurry and Kruger (1999).

The findings indicated in the present study are not in agreement with investigation carried out by Grey et al. (1991) and Kager and Holden (1999) which identified female adolescents as the chief risk group for poorly adapting to the challenges of diabetes
management and achieving optimal glycemic control. The common risks of not adhering to the prescribed treatment regimen of type 1 diabetes are hypoglycaemia which is a result of skipping insulin injections, consuming larger amount of carbohydrate, developing illness and stress and hyperglycaemia.

Though it was found that adherence did not have a statistically significant relationship with either of the clinical or socio-demographic variables, the medical and mental health practitioners, nurses, social workers and those who support the adolescent in managing their health condition should consider this information in relation to the treatment plan prescribed to them as these factors may have an indirect effect or probably a considerable effect after several months or years and these can facilitate in establishing whether a pattern of adherence is associated with these factors in consideration with developmental phase, the intensity of the illness, circumstances involved in following the treatment schedule and age.

For instance, this study comprised 74% of the participants from the underprivileged socio-economic status and most (86%) of them are school dropouts due to their financial position, a larger portion of the sample (59% + 35%) falls in the bracket of having intermediate and worse glycemic control and the onset of diabetes has occurred in childhood for most of them.

Thus, these can be the aspects based on which an empowerment or intervention module can be designed which could focus on the challenges faced in this specific socioeconomic status and the skills that can be developed in order to cope with the issues. Also, the focus can be on helping them to identify a vocation or job which could possibly aid in fulfilling their financial needs along with not being very demanding or causing excess stress that can take a toll on their health. Subsequently, they can be explained and educated in simple and easy ways about the effects of not being able to maintain a near normal glycemic control. Since they are in the adolescence stage, they can be given psychoeducation wherein an explanation about the psychosocial influences on their physiological health can be given. In concise, if the health professionals and supportive staff, who are involved in their treatment, are familiar with the resources available to their patients and their capacity to access them within the sphere of their community, referrals or recommendations can be effective for a longer term.
iii) **Analysis of relationship between metabolic control and psychosocial variables**

Though type 1 diabetes cannot be cured, it can be effectively managed by achieving a normal glycemic level which depends on adhering to the regimen through appropriate self-care by taking injections, attending the high or low sugar level fluctuations, retaining glucose level and food record and regularity of exercise. Thus, the management of diabetes in an optimal manner leads to metabolic control which entails a sequence of decisions that have to be made by the adolescents and their parents or caregivers on a daily-basis (Miller, & Drotar, 2006). Geist (1979) opinionated that promoting closer cooperation between those concerned with emotional challenges of patients with chronic illness and those in charge with their medical care would certainly enhance the technique of treatment and specifically shed light on the psychological prototype of chronic illness.

Metabolic control refers to the management of glycosylated haemoglobin which is the index of average level of blood glucose of past two to three months (American Diabetes Association, 2009). Often written in its acronym of HbA1c, it is included in the routinely check-up. If the HbA1c of 6 is reported, it is equivalent to an average level of blood glucose of 120. Successively, for an addition of 30 points higher than 120, a whole digit is added. Such as, if an average level of blood glucose is reported as 150, it is inferred that its equivalent HbA1c is 7. Thus, HbA1c of 8 is equivalent to an average level of blood glucose of 180 and in the present research; the HbA1c level below 8 depicts good metabolic control. Since adolescents are known to poorly adhere to their diabetes treatment regimens (Hoffman, 2002) and it is a possibility that they may not report their self-management in a reliable and valid approach, their HbA1c is considered largely as a reliable measure as an index of their adherence.

Thus, achieving the targeted HbA1c level is deemed as the only way by which diabetes can be managed effectively for the survival of the patient since it serves in keeping the associated complications at bay (Sherwani, Khan, Ekhzaimy, Masood, & Sakharkar, 2016). However, the management of type 1 diabetes is related to regular practice of self-care behaviours and activities carried out that aid in regulation of glucose metabolism (Ruggiero & Javorsky, 1999). Sustaining metabolic control in adolescence can
be complex since it can worsen which may serve as a risk factor for complications (Greening, Stoppelbein, Konishi, Jordan, & Moll, 2007).

Therefore, this section explores the relationship of metabolic control with psychosocial variables. As, managing diabetes is a challenging task, the objective of the present research study was to identify the variables associated with metabolic control through performing the analysis using Spearman’s correlation method. The correlation test demonstrated that there is no relationship between metabolic control and psychosocial variables. Thus, the hypothesis proposed that there is no relationship between metabolic control and psychosocial variables is accepted since metabolic control (HbA1c) did not yield a statistically significant relationship with self-esteem, coping strategies, emotional distress- anxiety and depression, emotional regulation-cognitive appraisal and expressive suppression, health related quality of life, perceived social support, diabetes related emotional distress and family functioning. Thus, former research studies which were aimed to find the relationship of metabolic control with physiological and clinical variables which did not yield a significant association between them led the research to imply on psychological variables which directed the present study to explore the influence of psychosocial variables on metabolic control and the analysis of the interpretation of psychosocial variables in conjunction with metabolic control has been detailed below.

**Emotional distress, diabetes related emotional distress, psychological morbidity and metabolic control**

In the present study, it was found that emotional distress which includes anxiety and depression, diabetes related emotional distress which involves feeling anguish and depressed specifically due to diabetes and psychological morbidity which entails departure from physiological or emotional state due to psychological conditions such as anxiety, depression, hypochondriasis and social sphere, were not related to metabolic control. However research carried out by Hood et al. (2006) concluded that children and adolescents who have type 1 diabetes report twice the rate of depression as compared to youth in general. In addition to this literature, Grey, Whittemore, & Tamborlane (2002) also concluded that poor metabolic control is related to depression in adolescents. Another research study reported an unclear relationship between depression and metabolic control in children and adolescents having type 1 diabetes (Swendsen, Maurice-Tison, & Salamon, 2003). Thus, this suggests that further research is required to establish the
relationship between depression and metabolic control considering the developmental changes occurring in the adolescence phase. In an investigation conducted in Kuwait by Moussa et al. (2005), it was reported that children who had HbA1c lesser or equal to 8% had significantly lower distress as compared to children with HbA1c of and above 10% along with a positive relationship between depression, anxiety and HbA1c concentration.

Therefore, few studies support the hypothesis proposed and suggest that metabolic control is independent of the psychosocial factors considered for the current study. This result can be supported by research carried out by Herzer and Hood (2010) on 276 adolescents with type 1 diabetes to evaluate symptoms of anxiety with glycemic control. Anxiety was measured with the State-Trait Anxiety Inventory and the results revealed that 17% of the sample had symptoms of trait anxiety and only 13% had symptoms of state anxiety and the analysis of association with glycemic control and blood glucose monitoring revealed that it was independent of state anxiety symptoms and an increased difficulty of psychological functioning was related to decrease in frequency of blood glucose monitoring and suboptimal metabolic control. Thus, neither state nor trait anxiety had an association with monitoring of blood glucose or metabolic control.

A potential explanation for the studies that prove there is an association between metabolic control and emotional distress which contrasts with the results of the present study can possibly be the duration of living with diabetes and the comorbid complications. In the present study, most of the participants had diabetes since one year (14%) followed by three years (13%) and 78% of the participants did not indicate the presence of any comorbid medical condition associated with diabetes. Though, there is moderate level of emotional distress suggested by their self-report (43%), the probable protective factors against reporting high emotional distress can either be higher coping orientation in solving their issues or higher cognitive appraisal (64%) or perhaps high self-esteem (86%).

Research states that children who experience higher life stressors are more likely to have worse metabolic control (Hanson, & Pichert, 1986; Worrall-Davies, Holland, Berg, & Goodyer, 1999). Stress specifically related to diabetes has been associated with worse metabolic control too (Malik, & Koot, 2009; Delamater, Patino-Fernandez, Smith, & Bubb, 2013). Fisher et al. (2007, 2010) had revealed significant association between metabolic control and diabetes specific emotional distress primarily in people with type 2 diabetes. Hence, these findings are in contrast to the finding of the present research which
did not show a significant relationship between diabetes related emotional distress and metabolic control.

**Family functioning, perceived social support from family, friends and significant others and metabolic control**

Findings from a former study carried out by Burroughs, Harris, Pontious and Santiago (1997) suggest that adolescents who belong to a cohesive family report having improved metabolic control along with adherence. Besides, in families with teenagers having type 1 diabetes, where parents had knowledge, understanding and were supportive about managing diabetes along with the skill-set of solving problems associated with managing diabetes, there was a positive relationship with improved HbA1c since this reduced the conflict in the family related to diabetes (Wysockiet al., 2008). These precedent findings are in contrast to the present research which does not yield a relationship between family functioning and metabolic control; and perceived social support from family, friends, significant others and metabolic control.

**Coping, health related quality of life and metabolic control**

The findings of the current study indicate that coping strategies and quality of life does not have a significant association with metabolic control which can be contrasted with a research done by Delamater et al. (1992) revealing that coping strategies were significantly related with glycemic control in diabetic adolescents and further stated that emotion focused style of coping in youth who had type 1 diabetes was related to poor glycemic control. Grey, Boland, & Davidson (1998) have made known in the research carried out that metabolic control and quality of life of adolescents can have a significant impact if they are provided with coping skills training in addition with an intensified treatment of insulin. Also, in a study carried out by Graue, Wentzel-Larson, Bru, Hanestadm, & Sovik (2004), it was found that increased utilization of active coping style had a significant relationship with better glycemic control and diabetes related life satisfaction in the adolescence age group of 13-18 years. Research done previously by Grey, Cameron and Thurber (1991) show that age is an important factor in children and adolescents when it comes to coping with an illness. Such as, younger children adapt to arguing or yelling whereas those who are older may adopt the behaviour of avoidance. Thus, there can be a probability that the limited age range in the present study which was 10-19 years did not yield significant results.
**Self-esteem and metabolic control**

Furthermore, in research conducted by Graue, Wentzel-Larsen, Bru, Hanestad and Sovik (2004), the regression analysis revealed that greater degree of self-blame led to greater worry, decrease in self-efficacy and decreased satisfaction in life related to diabetes which affected the metabolic control. The data from the current study is in contrast to this result since there was no significant relationship found between self-esteem and metabolic control. Another study also highlighted that self-esteem has a role with regard to perception illness, carried out by Wisting et al. (2016) with 105 type 1 diabetic patients of 12-20 years which revealed that the perception of illness is significantly related to metabolic control but the significance was found in females depicting 23% of variance and significant at 0.01 level.

**Emotional regulation and metabolic control**

Another result found that there is no relationship, either inverse or positive, between emotional regulation and metabolic control which is in contrast to the conclusions of a previous study conducted by Storch et al. (2006) described that, in the commencement of adolescence and culmination of childhood, the ability to regulate emotions and express it in a better approach is developed. Though the adolescents are able to regulate their emotions, it can be considerably influenced by their perception of how they are evaluated by other people deeming their developmental stage which is characterised by identity formation (Zeman, 2003). Thus, the emotional expressiveness of adolescent depends on approval sought by others which has a probability to influence their actions and the condition of type 1 diabetes adherence which involves actions such as monitoring blood sugar level, taking insulin, exercising and eating selectively which can be observed by those around. These observable actions if avoided in order to escape reactions from peers can impede diabetes self-management which can result in higher HbA1c levels and deterioration in metabolic control, thereby causing adverse effect on health.
Conclusion

The possible limitations that account for the acceptance of the hypotheses can be the onset of puberty which is related to fluctuation in insulin due to hormonal changes. Thus, the worsening of metabolic control can perhaps partially be attributed to puberty related hormonal changes (Goran & Gower, 2001; Moran et al., 1999), and probably partly to deterioration in adhering to the medical regimen by not following the recommendations of self-care as directed by the physician (Delamater, 2000; Greening et al., 2007; Holmes et al., 2006). However, it is imperative to mention that the accurate clinical causal factors of type 1 diabetes are still being researched whereas the clinical causal factors attributed to type 2 diabetes are known such as genetics, lifestyle issues, and the onset of an illness or obesity. The precise cause of type 1 diabetes mellitus is not yet known but there are a number of possible contributory factors such as genetic factors which state that type 1 diabetes tend to run in families. Epidemiologic studies have shown that brothers and sisters of children with type 1 diabetes have a higher chance of developing the disease (6% in siblings’ as compared to 0.4% in the general population) among the relatives of type 1 diabetes patients, underlying the role of genetic factors as a cause.

Also, certain limitations of the present study which have given way to dissimilarity in results as compared to the existing literature can be the selection of the sample which comprised patients largely from the underprivileged section who intake insulin through injections and those who regularly attend out-patient department of the hospitals. Thus, the participants in the present study exhibited that their metabolic control is independent of psychological and social factors respectively that have been considered in the present study. Also, the psychological and social factors were assessed through self-reported scales.

The present study suggests that possible reasons for this can be that there was diabetes related emotional distress and burnout due to diabetes in majority of the participants. There was an attempt to draw an association between blood glucose control and psychosocial variables, whereas the preponderance of blood glucose level of majority of the sample was average and poor. Thus, it can be supposed that reduced diabetes control is linked to rigorous feelings of not establishing concrete goals for diabetes management, feeling anxious or guilty for deviating from the prescribed regimen and worrying about the future related to diabetes. The findings did not indicate higher
emotional distress which involves anxiety and depression, most of the participants engaged in quite a few coping orientation and the descriptive results also point towards the piece of information that the participants reported higher level of cognitive appraisal and lower level of expressive suppression which shows that their ability to evaluate their thought and articulate their feelings is relatively high.

HbA1c-glycosylated haemoglobin or metabolic control, being a golden measure of the average blood sugar value of 2-3 months can be a life-threatening variable if not managed efficiently. Thus, maintaining a near normal glycemic control is extremely important for the purpose of living an extended life away from disability associated life years. To foster this, one must completely adhere to the regimen prescribed by medical health professionals. However, as research literature and the present research study also suggests that adherence leads to management of health condition. Therefore, one can seek help from mental health professionals to improve adherence which can lead to effective maintenance of blood sugar level and also maintain distance from diabetes associated complications.

In future, a longitudinal research can be conducted with a heterogeneous and larger population utilising the current research study’s objectives to assess if there is perhaps a relationship between metabolic control (HbA1c) and the psychosocial variables. Also, by combining quantitative data with qualitative information which incorporates insights of adolescents who have good glycemic control can present a comprehensive vision of self-care.
5.1 B) Qualitative Analysis

The systematic inquiry carried out by conducting focus group discussion with adolescents having type 1 diabetes and semi-structured interview with parents of adolescents having type 1 diabetes conveyed their perspectives about living with diabetes. Table 5.1 and 5.2 presented below illustrates the themes and sub-themes drawn through thematic analysis followed by the discussion of each theme.

Qualitative analysis was carried out uncover deep insights on the subject under discussion. The open-ended questions were scripted in the areas of physiological, emotional, social, self and behavioural for both focus group discussion and semi-structured interview and are represented in table 3.1. They were analysed to discover the themes. However, the small sample size, homogenous nature of the sample and the non-random approach of selecting the samples can prevent the generalizibility of the results although the opinions expressed may be widely held. The discussion and interview utilised probing as well as brainstorming. The objective of conducting a focus group discussion was to understand the perspectives of the adolescents having type 1 diabetes, about the challenges they have to face with regard to adherence and also to obtain inputs from them in order to enrich the development of the psychoeducation module. The objective of conducting semi-structured interviews with the parents of adolescents having type 1 diabetes was to understand their perspectives regarding the challenges of diabetes management and to understand how the chronic health condition can influence parent child relationship and the family.
Table 5.1

Illustrating the themes and sub-themes that emerged in thematic analysis of focus group discussion

<table>
<thead>
<tr>
<th>Focus Group Discussion</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Themes</strong></td>
<td><strong>Sub-themes</strong></td>
</tr>
</tbody>
</table>
| **Issue in adaptation to the needs of their health condition** | • Adjustment  
• Complicated  
• Time consuming  
• Level of comfort with family members and friends  
• Keeping diabetes undisclosed |
| **Need for greater self-awareness** | • Recognising physiological reactions  
• Identifying feelings  
• Anxiety about health complications |
| **Anger**              | • Confidence level of managing diabetes singularly  
• Frustration |
| **Learned Helplessness** | • Inability to use coping techniques  
• Development of negative feeling related to diabetes  
• Feeling anxious and deterioration in carrying out the management tasks |
| **Environmental influencing factors mainly family and school/college/workplace** | • Social stigma  
• Partial social acceptance from friends, family and peers  
• Disappointment of explaining about diabetes to everyone |
Table 5.2

Illustrating the themes and sub-themes that emerged in thematic analysis of semi-structured interview

<table>
<thead>
<tr>
<th>Semi-structured Interview</th>
<th>Themes</th>
<th>Sub-themes</th>
</tr>
</thead>
</table>
| **Bargain- seeking answers about its eradication** | • Coping to accept that type 1 diabetes is a lifelong health condition  
• Self-blame |                                                                                         |
| **Continuous emotional turmoil of the care-giver and its consequence on the affected individual** | • Psychological distress  
• Maladjustment  
• Depressive state |                                                                                         |
| **Fearful**               | • Life and death  
• Consequences of mismanagement  
• Fear of emergency situations |                                                                                         |
| **Seek an independent life ahead for their child** | • Uncertainty of future  
• Future difficulties with the disorder  
• Discouragement  
• ‘settling’ their child |                                                                                         |
5.1 B 1) Analysis of Focus Group Discussion

i) Issue in adaptation to the needs of their health condition

There was considerable discussion that centred on the problems faced by the adolescents in managing their health condition of diabetes and how they made their respective adjustment with it. Since the participants were school going, college going, school drop-outs and were either at home or working, they all described different set of challenges that they encountered. The common premise in the issues discussed was the medical aspect such as taking the insulin injection at the required time and carrying it with oneself, also maintaining and keeping a mental or written record of blood sugar levels and food consumed was reported as problematic. For example, DS explained “Everyday in the lunch time I go to the Principal’s office to take my injection. I don’t tell anyone and only my class teacher knows. I tell my friends I am going to bathroom” whereas JA said “I go to the toilet in college to take my injection”.

A participant who was working in a factory stated that “It’s difficult to carry injections because the watchman checks my pockets before entering and after leaving and they think this is something else (Pointing possibly towards drug)”, on asking why he doesn’t prefer disclosing this, he replied “Then I will not get a job because they will be scared if something happens to me.” This can be corroborated with literature provided by Weissberg-Benchell, Wolpert and Anderson (2007) about emerging adults having type 1 diabetes face situations in which they have to make complex decisions when compared to their peers in an optimal state of health.

The aspect that also emerged in adaptation issue was being comfortable in sharing or disclosing about type 1 diabetes and the importance of taking injections. If the individual accepts it then they should ideally not be scared of others reactions as long as they can explain it to them. However, the awareness of this health condition is not spread wide and clear which can be an inhibition in the society accepting that injecting oneself is a form of survival.

ii) Need for greater self-awareness

When the topic of awareness of one’s feelings in association with physiological reactions that take place in the body was raised, it was discussed and inferred that this area was not a primary focus and the talk regarding feelings lasted for a shorter duration as
compared to other questions. The participants recalled self-care resembling a mechanical task. Perhaps, the activities of self-care and their daily activities apart from attending to their health condition, exhausts them to such an extent that catering to how they are feeling and how it is having an influence on their sugar levels or fulfilling their self-care activities is of secondary concern. Considering their socio-economic status, these adolescents do not have the luxury of time to probably think about their emotions in different situations or take time to reflect on how their day passed by since they are involved in household chores when they are back from school, college or working.

Another sub-theme that emerged was the anxiety of the participants about the effects of type 1 diabetes such as low or high blood sugar reactions. The anxiety and worry was reported largely by girls whereas the boys participating did not converse much on whether or not they felt anxious. This was one of the common issues discovered in the dialogue of the participants having type 1 diabetes and parents of adolescents having type 1 diabetes. It appears this is the prevalent theme due to the unawareness factor of how to handle this emergency situation.

When the participants were asked whether they have encountered such a situation before, few replied affirmatively but said it was not very serious because they always carried something sweet with them. Thus, this concern can be addressed through creating awareness by educating the adolescents having diabetes along with their parents, caregivers, friends and neighbours about hypoglycaemia, hyperglycaemia, its symptoms and treatment; also the side-effects of ignoring the symptoms can be explained. This may perhaps serve in enhancing the confidence of managing diabetes and furthermore, managing it effectively.

**iii) Anger**

It appeared that the participants had lower confidence of managing any episode related to diabetes which involved external help and the inability to manage it single handed resulted in anger. Also, the fact that they had to deal with managing diabetes day in and day out left them with feelings of frustration and annoyance because they cannot deviate at their wish, the deviation from their food or exercise routine either needs to be planned or compensated later on, in the context of which one participant said “I cannot go out with my friends because my mother has told not to tell anyone about it and when i go out with my mother, she will be telling me what to eat or I will eat at home and then go.”
iv) Learned Helplessness

This theme surfaced as the participants could not discuss elaborately about the ways, of the things or people that would be of help or had helped them in coping with the problems of managing diabetes whether directly or indirectly. A participant, who was a school drop-out due to financial restrictions and had difficulty in maintaining near normal glycemic control, stated, “I eat properly but still I have high sugar, what I can do still?” This statement reflects that the individual may not be finding an effective technique to cope with the situation of high sugar level.

However, this can become serious in the long-term as they may have to face the consequences such as blindness, kidney dysfunction and diabetes ketoacidosis. This can be corroborated with a study by Peters, & Laffel (2013) which state that 40% women who are between the age range of 15 to 30 years report disturbance in eating behaviour with intentional restriction of insulin and this behaviour peaks in late adolescence as well as early adulthood. This may lead to developing negative feelings characterised by consistent high blood sugar level, about one’s body image, feeling anxious, depressed, deterioration of activities related to diabetes management and the outcome of all these can be life-threatening.

Thus, making adolescents think about their strengths and limitations in all the areas of life and facilitating them in varied strategies that can be employed in coping with problems they encounter in daily life can possibly improve their adherence to regimen.

v) Environmental influencing factors mainly family and school/college/workplace

The sub-themes that emerged in environmental influences was social stigma, social acceptance which includes acceptance from family, peers and friends. The participants who belonged to the stage of older adolescence stage expressed objectively that diabetes comes with isolation at home or in workplace since people around them misunderstood diabetes and that influenced their behaviour and feelings. A participant discouraged by diabetes said “My father does not talk to me after I got diabetes but he talks to my sisters. My mother says he is thinking about work that’s why “this kind of reaction can be discouraging and may influence the management of diabetes since they are made to feel different from their family members and not being accepted can cause frustration if the
issues are not dealt with sensitively or explained to the child in a rationale manner. Another female participant who attends college said “I eat whatever my friends eat when we go out because I have only told my best friend that I have diabetes”.

Probably the disappointment of having to explain many individuals around about diabetes sometimes leaves the person affected with diabetes to not disclose it to everyone. Also, probably to avoid the feeling of being discriminated by peers and stigmatised, the individual could take the risk of eating what their friends eat. This premise can be linked to research conducted by Schur, Gamsu and Barley (1999) which type 1 diabetics from the age of 16 years to 22 years and uncovered that the pervasive fear of being stigmatised, of other people coming to know they are ‘different’ and being constantly judged by peers.

Conclusion

In the focus group discussions conducted, there were few observations made which can assist in the explanation for arriving at these responses. Some of the participants skipped responding to few questions despite they were encouraged to do so and as a consequence few questions took lesser time for discussion as compared to others. The participants were not from a very diverse background or qualification which can limit the ability to generalize the information gathered.

For further research, specific aspects of managing type 1 diabetes such as the frequency of monitoring glucose level, sharing diabetes related or personal issues affecting diabetes management with the doctor or nurse can be discussed; also the facets of school, college or work sphere which may influence in following the diabetes care plan obediently can be dialogued. These topics can be of potential interest for a social gathering to spread awareness about diabetes which can includes individuals with type 1 diabetes or their caregivers, peers, friends or people who voluntarily want to support diabetic individuals.
5.1 B II) Analysis of Semi-structured Interview

i) Bargain- seeking answers about its eradication

The narratives of the parents suggested intrapersonal conflict since diabetes was genetic in few families, few thought that it was because of fever as the symptoms appeared like that and for few, their relatives had told them to try alternative techniques for its eradication since their children were yet small and they could do away with it.

A parent said “It’s because I eloped and got married but I will do something for my daughter so that we don’t suffer. I am going to other places also (non-medical centres).” Therefore, the personal barriers that are coming in the way of complete acceptance of the health condition can be explored.

Thus, coping with the acceptance of the disorder is imperative and in this discussion, it comes into view that the parents are in the process of accepting where they are bargaining. This can be corroborated with Kubler–Ross model which postulates five stages of grief namely: anger, denial, bargaining, depression and acceptance (Kubler-Ross, 1995).

Also, the parents have to cope with their stress and anguish of their child’s diagnosis with diabetes. In a research conceded, the mothers (n=107) of the adolescents participated in the research of coping with stress and it emerged that emotion-oriented coping style of mothers had contribution in predicting focus-oriented coping styles in adolescents with type 1 diabetic adolescents whereas in the group of non-diabetic adolescents, mother’s reported task-oriented coping style which predicted the coping style of seeking professional help whereas mother’s who utilised avoidance-oriented coping strategy contribute to predicting the seeking of spiritual support in their children (Pisula, & Czaplinska, 2010).

ii) Continuous emotional turmoil of the care-giver and its consequence on the affected individual

This emergent theme is consistent with literature studies showing that numerous parents face psychological issues after their child has been diagnosed with type 1 diabetes. In a study carried out by Whittemore, Jaser, Chao, Jang, Grey (2012), it was reported that
on an average 33.5% of parents experienced distress at the time their child was diagnosed with 19% of parent’s still experiencing distress from 1 to 4 years after diagnosis.

A former study by Kovacs et al. (1985) observed that the mothers of type 1 diabetic children can be susceptible to problems related with psychological maladjustment after the diagnosis was received, which had a significant relationship with depression in one third of the sample of mothers whereas for many, the problems of adjustment were resolved in the first year of having received the diagnosis.

**iii) Fearful**

A parent said “I am scared if she will die early”. Another parent said “If something happens to him?”; Reflecting fear along with the need to become aware of the maladaptive ways of leading life that can lead to the consequence of early death. This premise can be corroborated with a study conducted by Barnard, Thomas, Royle, Noyes, & Waugh (2010) in which parents were commonly found to be fearful of hypoglycaemia in their children who had diabetes and this fear has also been related with the emotional distress and poor glycemic control in type 1 diabetes children (Haugstvedt, Wentzel-Larsen, Graue, Sovik, & Rokne, 2010).

**iv) Seek an independent life ahead for their child**

Selective excerpts reported by parents of adolescents having type 1 diabetes:

BK: ”No one will marry my daughter, what will I do?”

KS: “I know it’s very difficult to get my son married, what if the girl comes to know and does not get married”

LP: “I have to make my daughter study and do a job so she can live because how can she marry like this (with diabetes).”

T: “How will I save for my daughter, what to do? How will she be after I’m gone?”

The above selected statements are expressed by the parents of adolescents having type 1 diabetes. This information sought which has been drawn together can be linked with a former study carried out by Dunning (1995) which found data that stated uncertainty is related to thought of having to live with diabetes. Thus, these statements highlight the morale of the parents regarding the future of their daughter/son and their
need to ‘settle’ their child. This can also reflect that their thoughts are enroute of coming to terms with diabetes and the difficulties it can pose. Parents who participated perceived marriage as a big event in life which will not take place for their child which perhaps is very disappointing for them. From a constructive viewpoint, it can be seen that these statements which are echoing discouragement and worry can be integrated to adapting to launching their child independently.

Conclusion

The present research did not identify whether the problems recounted in the semi-structured, by the parent were their own or a collective recount of the family and whether they were a source of conflict. Thus, this topic can be carried further since it explores the perceptions of parents and can have an impact on the parent-child relationship. Also, parents who are more encouraging and supportive of their children are viewed more positively by their children, which can possibly lower the likelihood of parent-child conflict.

For research in future, the topic on financial management of individuals having type 1 diabetes can be considered keeping in view of the fact that their parents are worried about the future life of their child. Further research can identify the job sector wherein those who have type 1 diabetes may not feel threatened of losing their job since they have to cater to a demanding health condition and this job security can give confidence to the parents who search for ways in which their child who has diabetes can live without hassles. Further, a support group for parents can be formed where their concerns are addressed and they don’t feel isolated with the problems they come across. Thus, it appears important to promote positive cognitions which can strengthen the ability of the parents to accept and support management of diabetes related activities and it can have a positive influence on their child as it can possibly improve parent-child relationship along with improving adherence to the regimen.
5.2 Phase 2: Psychoeducation

Researchers have documented that education programs which educate on management skills are effective in enhancing clinical outcome than programs that merely offer information regarding the disease itself (Bodenheimer, Lorig, Holman, & Grumbach, 2002). Individual education sessions adapted to every adolescent’s requirements with information on how to be flexible with their regimen and regulate their routine to diverse problems and conditions were most effective (Kyngas, 2003). Interventions which facilitate motivational and solution-focused group therapy are as well effectual in enhancing metabolic control in adolescents with diabetes (Viner, Christie, Taylor, & Hey, 2003). Moreover, researchers have incorporated coping skills training (Davidson, Boland, & Grey, 1997) along with stress management techniques (Boardway, Delamater, Tomakowsky, & Gutai, 1993) into interventions related to diabetes management. These collective interventions for the treatment would provide psychological and social support to knowledge about diabetes apart from knowledge exclusively about medical management. Since self-image is being formed during the period of adolescence and being adherent to the diabetes tasks, on a daily basis is a fundamental part of their existence, it emerges as the most suitable time to impart education related to diabetes along with information about the emotional and social concerns associated with diabetes (Comeaux, & Jaser, 2009).

Former research studies conducted also demonstrate that higher levels of knowledge in children and youth with diabetes lead the way to having improved metabolic control as compared to young people with lesser levels of knowledge (Auslander, Haire-Joshu, Rogge, & Santiago, 1991; Malhotra, & Antony, 2016). An individual’s reaction post diabetes diagnosis varies depending upon the age, how the news is shared with them and the reactions of their parents. Few may require more assistance on how to cope with psychological stress whereas others may need aid on coping with lifestyle changes. The core diabetes management tasks such as keeping a tab of nutrition and food, self-monitoring of glucose levels, body mass index, exercise and clinic appointments are the essential regulations that have to be followed. If these are followed consistently in addition with psychological therapy, they can be of greater value in providing support and demonstrating the different coping styles that can be helpful in diabetes management (Delamater et al., 2001).
Adherence to different factors related to management of type 1 diabetes can be enhanced by placing importance on education programs related to self-management wherein the physician can play the role of identifying patients who do not adhere to the therapy prescribed and provide these patients with a brief education session on making them aware of the consequences of nonadherence or refer them to a psychologist (Kesavadev et al., 2014). Behavioural and psychological interventions have been shown to improve compliance to therapy in children and adolescents along with establishing better glycemic control, enhanced relationship with peers and family along with superior coping skills (Delamater, 2009; Winkley, Ismail, Landau & Eislerr, 2006; Delamater et al., 2001).

Therefore, the objective was to develop a psychoeducation module which can facilitate the management of diabetes by focusing on the emotional and social aspects which influence adherence. Adherence to the regimen eventually leads to management of diabetes. Since, the cohort of the present research study were adolescents, the intention of developing a psychoeducation module was to lead them towards self-management as the adolescence developmental phase is characterised by the need to seek autonomy and the ability to critically explore their surroundings. Subsequent to obtaining the significant variables influencing adherence and predictor variables contributing to adherence and nonadherence in the initial exploratory phase; along with the theoretical framework of cognitive behavioural therapy and positive psychology, the module was developed.

The structure of executing the information contained in the psychoeducation module was prepared in the structure of worksheets focusing on the areas that influence and predict adherence. The worksheets were developed in vision of the feasibility of adolescent’s understanding and assisting them to reflect on their behaviour and come up with their solutions for the challenges they face along with setting goals and recognising their strengths and virtues. The intention of making them feel in command of their behaviour was to facilitate them in accepting responsibility for their actions by not instructing them or overpowering them. As a consequence, the function of psychoeducation module was to empower the adolescents towards self-management by focusing on the psychological and social correlates, predictors of adherence and perspectives of adolescents and their parents.
i) Group differences

Before and after the psychoeducation module was implemented, the participants were assessed on the significant variables and predictor variables of adherence, identified in the exploratory phase, in order to decipher the effect of the psychoeducation module. The variables assessed were adherence, diabetes related emotional distress, psychological morbidity along with its components which included depression, anxiety, social impairment and hypochondriasis and family functioning along with its components of affective involvement, affective responsiveness, behavioural control, communication, problem solving and roles identified in the family.

Before implementing the psychoeducation module, the differences between experimental and control group were analysed using the Mann-Whitney U test after which the results revealed statistically significant differences in family functioning ($p=0.05^*$) and its component of behavioural control ($p=0.02^*$), communication ($p=0.01^{**}$) and problem solving ($p=0.03^*$) between the experimental and control group. There was a noticeable difference in the mean scores of family functioning as the scores were higher in the experimental group ($M=93.87$, $SD=7.65$) as compared to the control group ($M=87.67$, $SD=8.97$) which indicates a dysfunctional pattern of family since higher scores indicate that the family is moving towards a dysfunctional working pattern on a continuum which ranges from low scores to high scores representing functional pattern in the family to dysfunctional pattern. A dysfunctional family is characterised by conflicts and an indiscipline atmosphere.

The higher scores in behavioural control component in the experimental group as compared to the control group; depict the inability to maintain and express standards for behaviour of the members of the family suggesting that each member of the family can behave in the way they want to. This includes behaviour in a range of situations such as dangerous wherein no rules are established for emergency situations; social place which involves getting away after violating any regulation and psychological state which can condition the family members that they can’t expect a fair resolution if something wrong happens or one can behave in the way they desire. The aspect of communication reveals that the content and sense of verbal communication is not comprehensible and the facet of problem solving indicates the inability of the family members to resolve interpersonal issues that can threaten the integrity of the family. In addition and apart from the
significant differences, it was prominently observed from the mean scores that adherence in the experimental group was low ($M=53.4, SD=13.71$) as compared in the control group ($M=60.93, SD=8.92$) wherein higher scores depict higher adherence. Although there were differences in mean scores of diabetes related emotional distress and psychological morbidity in the experimental and control group, the difference in scores were not outstanding.

After the implementation of the psychoeducation module, there weren’t any statistically significant differences found in the post scores of the psychosocial variables namely, adherence, diabetes related distress, family functioning and psychological morbidity; between the comparison of experimental and control group.

The possible explanation for this can be that before the psychoeducation module was implemented itself, the experimental group had poor scores depicting low adherence and high dysfunctional family as compared to the control group which had good scores [experimental group adherence score before psychoeducation= $M=53.4, SD=13.7$; control group adherence score before psychoeducation: $M=60.93, SD=8.92$; experimental group family functioning score before psychoeducation: $M=93.87, SD=7.65$ (higher scores indicate dysfunctional pattern in the family); control group family functioning score before psychoeducation: $M=87.67, SD=8.97$]. However, possibly due to this reason, a significant difference could not be established after the implementation of the psychoeducation module, since the control group continued to maintain the same status of scores afterwards also, as the mean scores in the control group did not show any noticeable change in the scores post psychoeducation, such as (experimental group adherence score after psychoeducation: $M=58.33, SD=62.33$; control group adherence score after psychoeducation: $M=62.33, SD=8.62$; experimental group family functioning score after psychoeducation: $M=90.73, SD=7.09$; control group family functioning score after psychoeducation: $M=88.73, SD=9.17$). Thus, the control group scores maintained status-quo. With regard to the experimental group, there was improvement observed in the post scores illustrated after the implementation of the psychoeducation module, in contrast with the pre scores in the experimental group.
**ii) Pre post comparison of experimental and control group**

To observe the comparison between pre and post scores in the experimental and control group, Wilcoxon ranked signed test was performed and it was found that behaviour control component of family functioning showed a statistically significant difference \((p=.02^*)\) in the experimental group before and after implementing the psychoeducation module. The scores of behaviour control component decreased from \((M=23.60; SD=2.38)\) before implementing the psychoeducation module to \((M=21.87; SD=2.59)\) indicating a significant improvement and movement towards functional behaviour control wherein the adolescent knows what to expect when the rules established in the family are surpassed and how to behave in a disciplined way in varied situations. The adolescents probably corroborate the discipline in management of diabetes too by understanding the consequences of nonadherence to the regimen.

Therefore, the scores also indicated an improvement in adherence to the regimen since the psychoeducation module intended to empower the adolescents towards improved adherence that can lead to enhanced self-management. The mean scores of adherence in the experimental group also demonstrate an increase in the level of adherence after the psychoeducation module was implemented since it increased from \((M=53.4; SD=13.71)\) to \((M=58.33; SD=11.14)\).

Also, the mean scores of family functioning variable improved after the psychoeducation module was implemented. Before implementation of the psychoeducation module the mean value of family functioning variable was \((M=93.8; SD=7.65)\) and after implementing the psychoeducation module, the mean value decreased to \((M=90.7; SD=7.09)\) which indicates a shift from the dysfunctional to the functional continuum. The mean scores can be observed to perceive the potential or prospective variation. Furthermore, the variables which have evidenced for a noticeable change with respect to the mean scores presents the factors that can be enhanced through empowerment.

Through the effect size analysis, it is revealed that psychoeducation module has had a larger effect in the family functioning component of behavioural functioning in the experimental group \((Cohen’s d=0.69)\). Thus, the psychoeducation program which was aimed to empower the participants to progress towards self-management has been beneficial since this component now portrays that that there has been self-control, rules are
established and followed, expectations are being attached to the outcome of each situation, there are social limitations, the emotional concerns are sorted, family members have made an arrangement for emergency situations and discipline is initiated which has helped in carrying out self-care behaviour/s of adhering to the regimen of diabetes management. However the other variables in the study that have reported a medium effect with the implementation of the psychoeducation module to the experimental group are adherence ($d=0.39$); diabetes related emotional distress ($d=0.27$); family functioning ($d=0.42$) and the components of family functioning such as affective involvement ($d=0.32$); communication ($d=0.21$) and problem solving ($d=0.44$).

The indication of the effect size of the present research study is similar to an internet based intervention programme for improving self-management in type 1 diabetic adolescents carried out by Mulvaney, Rothman, Wallston, Lybarger, & Dietrich (2010), in the age-group of 13-17 years adolescence period that had been diagnosed with diabetes for a minimum of six months. But this programme was for 11 weeks which were based on social cognitive theories, it had stories depicting barriers to self-management, the approaches that can be used in solving problems and to cope with it. The mean scores of the results showed that self-management increased after the internet based intervention and the range of effect size monitor was 0.28 to 0.64. The effect size obtained in the present research study is corroborated with former research studies carried out by Hampson et al. (2000); Grey, Boland, Davidson, Li & Tamborlane (2000); Fisher, Thorpe, DeVellis & DeVellis (2007); Cook, Herold, Edidin, & Briars (2002), that have been performed for a longer duration of time span utilising in person approach wherein the intervention focused on coping styles and problem solving.

The psychoeducation module developed for the present research study has a multicomponent approach which is similar to the interventional investigation carried out by Grey, Boland, Davidson, Li, & Tamborlane (2000), wherein the coping skills training intervention given, targeted more than a single process of behaviour and the effect size of 0.49 was yielded which was a large effect size. Another alikeness of the psychoeducation phase of the present research study can be drawn with a particular intervention programme that has recently sought consideration is Motivational Interviewing (MI) in which the interviewer engages with the patient in an empowering, collaborate and motivational discussion to facilitate the patient to formulate goals towards changing their behavioural approach for better management of chronic illness (Miller, & Rollnick, 2012).
The present research delivered a psychoeducation module which is for a short duration distributed over two months unlike previous researches carried out where psychoeducation was an intervention program that spanned a long duration to improve diabetes outcome. For instance, an 18 months internet psychoeducation program designed by Grey et al. (2013) for the Teen Cope Study Group; a 12 months internet intervention program performed by Jaser et al. (2014) which centred on coping skills and diabetes education based on the model of stress adaptation which explains the impact of stress on diabetes and the conclusion was that quality of life improved but not metabolic control.

The utilization of technology is considered as an innovative approach to improve adherence to regimen in adolescents having type 1 diabetes. In addition with internet intervention programs, cell phones are also used as a tool in interventional programs to promote adherence by sending text messages to remind and motivate the youth to follow tasks related to diabetes such as checking blood sugar levels. The result of an investigation carried out by Mulvaney, Anders, Smith, Pittel, & Johnson (2012) reported that sending 10 text messages every week for a time span of three months to 23 adolescents who have type 1 diabetes demonstrated that the experimental group had a stable metabolic control as compared to the control group which reported a decreased control of sugar level. The messages sent were delivered before and after the meal timings and before the bed timings of the participants in the experimental group. Another pilot research on the same position for a period of three months described that the participation of 40 adolescents and youth having type 1 diabetes in the experimental (N=22) as well as the control group (N=18) had decreased after a time span of one month of receiving consistent messages in which the experimental group received text messages and the control group received messages by e-mail and neither of the groups stated any change in the glycemic level possibly due to the repetitive nature of information or the writing style in which it was conveyed which may have exhausted the participants (Hanneur, Wentzell, Laffel, & Laffel, 2009).

Although the literature studies suggest a longer period of intervention programs are required for a stable outcome. The present study intentionally focused on constructing a shorter duration module supported by the investigator’s perspectives and observations on field. Since, the time span of accomplishing the execution of the module was perceived as a challenging task as most of the participants came either alone for the appointment or with a neighbour or a relative and few came with their parent. The participants were from a low socio-economic status and could not travel more often to the hospital except once in
a month when they had an appointment out of which a few visited their doctors once in two or three months or rather consulted over the phone. Regardless of noticing this, the investigator requested the participants and their parents if they could visit the hospital on one more day of the month apart from when they had an appointment with the doctor but the feedback was not satisfactory. As a consequence, it was decided that the psychoeducation module will facilitate the adherence towards management of diabetes through empowering them pertaining to the psychological and social factors that can influence adherence. Hence, the psychoeducation module was intended to serve as an empowerment program in view of the fact of the time span which is distributed across two months with two sessions and homework between the sessions.

From the observations made while conducting the focus group discussions and semi-structured interviews, it was discovered that the expression of feelings and disclosure of content of life events were minimal. Also, the concept of sharing their feelings about what events take place in their lives apart from managing the challenges of diabetes was not evident when the investigator had conducted focus group discussions with the adolescents and semi-structured interviews with their parents. In addition to this, their transitory developmental age was a decisive factor of not delivering the psychoeducation module by lecture method but through a form in which they can be engaged and empowering them can be effective, such as stories, exercises, penning down their thoughts and feelings, brainstorming solutions, recognising one’s skills and discussing the challenges they faced.

Thus, the present research study can have a follow-up and the variables can be assessed after a few more months to observe if there is any significant change in the values obtained formerly. The psychoeducation module was based on the explorations made in phase 1, however, this can be one of the limitations since the representative sample was selected from a restricted region, socio-economic status, age and the medium of language instruction. Another limitation can be the absence of establishing psychometric properties for the psychoeducation module developed and executed in the format of worksheets.

Through the development and execution of this module, the implications for further research become noticeable. Firstly, this module was based on the significant correlates explored but in future it would be advantageous if there is a significant link drawn with glycemic control too and this may require more time or a larger sample size.
Secondly, the module developed can be given to another sample of adolescents with type 1 diabetes such as those from a different region, socioeconomic status and taking insulin through pumps or pens instead of injections in order to test its validity. Thirdly, a multi-site research study can be considered and the fourthly, the scales selected can be of such nature that both the participants and their care-givers can provide information for the same scale for precision of data gathered.

The current research represents a primary action to empower adolescents in self-management of diabetes. Specifically in India, the milieu of insufficient awareness, limited resources of mental health and lesser percentage of people seeking help can be the plausible reasons behind unnoticed disturbance in adolescents who require help. Therefore, facilitating self-reflection, an encouraging atmosphere to relate to their emotional needs along with creating an informed and supportive network can be beneficial in educating the adolescents about the psychological and social factors that influence management of diabetes and the module can be delivered not exclusively in a clinical setting but also in an educational or therapeutic set-up. The module can be both qualitatively and quantitatively scrutinised and extended further for intervention purpose.