

Health related Quality Of life in type 1 diabetes pediatric patient and their parents.

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ABSTRACT

Background: Type 1 Diabetes Mellitus (T1DM) is a heterogeneous disorder, which is characterised by destruction of pancreatic beta cells, culminating in absolute insulin deficiency. T1DM accounts for approximately 5–10% of the total cases of diabetes globally. It has been historically, and continues to be, the most common type of diabetes in children and adolescents.

Objective: This research aimed to evaluate the Health-Related Quality of Life (HRQoL) of children and adolescents with T1DM in Saudi Arabia. It also aimed to analyse the impact of this disease on the quality of life of their parents.

Methodology: This cross-sectional research included the sample size of approximately 255 individuals. The sample population consisted of approximately 139 children aged 4 to 18 years old, with a definitive diagnosis of T1DM. The sample population had been visiting the paediatric diabetic clinic at King Abdul-Aziz University Hospital (KAUH). The sample population also consisted of approximately 116 parents of children suffering from T1DM. This research utilised the Pediatric Quality of Life Inventory (PedsQL) for the diabetic patients and a generic WHO Quality of Life-BREF (WHOQOL-BREF) model questionnaire for parents. The cross-sectional analysis was conducted and HRQoL was assessed by interpreting data collected from the sample population.

Results: The sample population (n=225) for this research consisted of approximately 52.2% males and 47.8% female patients. On the other hand, approximately 15.7 % fathers and 83.5 % mothers participated in this research. Statistical analysis revealed that children who never suffered from sleeping problems and never had attention problems at class had not missed school because of illness. The positive significant relationship was also found that children who never had trouble keeping up with their schoolwork had had never missed school because of illness. Moreover, children who did not complain about running problems did not face problems in getting along with others. On the other hand, children having low energy levels faced problems at school and also had trouble in getting along with others. The statistical analysis revealed negative significant relations between parent's psychological health and child's school problems. The negative significant relations were also found between age levels of children and the number of children finding difficulty in lifting something heavy and taking a bath or shower.

Conclusion: Unique aspects and health care delivery system of Saudi Arabia renders that it is extremely important to understand T1DM consequences on quality of life of patients. The results of this study might also contribute to changes in professional medical practice that ensure better QoL for T1DM patients. The research outcomes might also contribute to improve the quality of routine care to patients with T1DM in the light of experiences of patients and their parents.

Index Terms— diabetes mellitus , type 1 diabetes , quality of life , T1DM , HRQoL , WHOQOL-BREF , PedsQL

1. INTRODUCTION

Diabetes Mellitus (DM) affects individuals of varying ages and races. This disease is considered as the most prevalent medical complication across the globe (Ravens-Sieberer et al. 2010). Type 1 Diabetes Mellitus (T1DM) is the most common type of diabetes in children and adolescents. This disease approximately affects 20 to 25 per 100,000 individuals in the United States (Maahs, West, Lawrence, and Mayer-Davis 2010; da Costa, and Vieira 2015). This disease has been found to affect approximately 70,000 young individuals every year. In this regard, the rate of prevalence of T1DM has been rising globally (Federation 2013). Similar to other regions of the world, the incidence of T1DM has been rising over the last 30 years in Saudi Arabia, such that the rate of prevalence of T1DM in Saudi Arabian children and adolescents is 109.5 per 100,000 (Al-Herbish et al. 2008; Cherian et al. 2010). T1DM and its complications may affect patients' living conditions over the years and may influence their Quality of life (QoL) (Al-Herbish et al. 2008). A growing interest has developed in the past decades for assessing determinant factors of patients' Health-Related Quality of Life (HRQoL), especially in chronic diseases (Nansel et al. 2008). Moreover, over the most recent years, the HRQoL had provided some most important com-

plementary results to clinical and laboratory markers (Delamater 2009).

The acceptable HRQoL score is considered as a marker of individuals' ability and fitness to deal with their diabetic treatment and accomplish treatment objectives (Delamater et al. 2008; Cameron et al. 2003). Low HRQoL scores reveal that patient is at risk of psychological maladjustment, and possess reduced adherence to treatment. The low values of HRQoL also identify that patients possess reduced compliance and poor metabolic control (Cameron et al. 2003). Despite these risks, it is neither conceivable nor important to offer particular mental health services to all T1DM patients (Cameron et al. 2003).

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HRQoL assessment is considered as an important end-point measure from the clinical and epidemiological point of view (Lustman et al. 2000). Appraisal of HRQoL in clinical practice is crucial for the assessment of the course of the disease and for the diagnosis of diabetes-related complications in early stages. The HRQoL is also assisted in the identification of the most appropriate type of insulin therapy, which would be

satisfactory for maintaining metabolic control (Rewers et al. 2014). Previously published researches demonstrate that higher HRQoL scores are most often found among young patients. Similarly, the higher HRQoL score also demonstrates shorter span of T1DM (Hoey et al. 2001; Wagner et al. 2005). Other researchers reported that male diabetic patients reported better HRQoL scores, as compared to female patients (Ravens-Sieberer et al. 2010). Moreover, the research outcomes revealed the presence of a positive relationship between metabolic control and HRQoL (Hoey et al. 2001; Wagner et al. 2005). Furthermore, young patients, residing with single parents and belonging to low socio-economic background were found to have high HRQoL scores (Delamater, Patiño- Fernández, Smith, and Bubb 2013).

A systematic literature review involving 17 studies assessed the impact of T1DM on QoL across different developmental stages in children and adolescents. The systematic review included studies, which were published between the years 2000 to 2012. The systematic review aimed to analyse generic QoL in T1DM patients. The research outcomes revealed disease-specific QoL issues, including a negative effect of diabetes on the activities of daily living and diabetes-related stress. Another review conducted in Kuwait demonstrated that HRQoL of children and adolescents with T1DM failed to provide the reliable outcomes in comparison to control. The research outcomes indicated that parents revealed poor QoL scores as compared to the diabetic children (AlBuhairan et al. 2016).

The research conducted by Al-Hayek et al. (2014) was published in Saudi Med Journal, which aimed to assess the significance of HRQoL for adolescents diagnosed with T1DM in the Saudi population. The research outcomes revealed that there are some factors, which contribute to poor HRQoL outcomes. The research outcomes revealed that female gender, longer duration of T1DM (>7 years), diabetic ketoacidosis, multiple daily injections (MDI), and adolescents with >7 HbA1c level contribute to low values of HRQoL.

Most studies, which identified the role of QoL among diabetic patients, had been conducted in the regions of North America, Australia, and the UK (Shaw, Sicree, and Zimmet 2010). However, few studies were also carried out in Arabian Gulf region. There is a great difference in the health care delivery system, religion, culture, and family dynamics among individuals residing in different societies. For this reason, it is crucial to require evaluating QoL among individuals residing in different communities. In this regard, this research aimed to assess HRQoL among children suffering from T1DM, along with the perceptions of their parents.

2. METHODOLOGY: The study was conducted in the outpatient section of the Department of Paediatrics at King Abdul Aziz University Hospital (KAUH) in the city of Jeddah in Mecca, Saudi Arabia from June 2017 to August 2017. The sample population for this research consisted of young diabetic patients; therefore, children visiting the selected healthcare departments were clinically interviewed. The researcher utilised the generic WHO Quality of Life-BREF (WHOQOL-BREF) measurement model for parents and the Paediatric Quality of Life Inventory (PedsQL) model for children (Nansel et al. 2008; Tofigh et al. 2012). The data collection tools consisted of a set of institutionalised data collection sheets consisting

of series of questions with multiple answer choices. The questionnaire was comprised of 26 items which were comprised of four domains; physical health, psychological health, social relationships, and environmental influence.

Paediatric patients included in this research were required to fulfil the inclusion criteria. In the light of inclusion criteria, the sample population for this research was required to have definitive diagnosis of T1DM. The research participants need to be approximately 4 years to 18 years old. Moreover, it was also assured that the sample population participating in this research need to be diagnosed with T1DM at least 6 months ago. The exclusion criteria for this research stated that the sample population must not suffer from other major chronic diseases, psychiatric diagnosis, and cognitive disabilities. Similarly, a separate eligibility criterion was also present for participating parent. In the light of this criteria, individuals having no major psychiatric diagnosis

Statistical analysis for this research was performed by using the Statistical Package for Social Science (SPSS). This study targeted the entire paediatric population of Kingdom of Saudi Arabia. The sample size for this research comprised of approximately 255 individuals, consisting of 139 T1DM patients (having age between 4 and 18 years). The sample population for this research were following up at the paediatric diabetic clinic at KAUH. The sample population also consisted of approximately 116 parents.

The research participants were selected on the basis of prior selected inclusion criteria. The previous history of patients was acquired from parents children with diabetes who had been visiting Paediatric Endocrinology Clinic in KAUH, a tertiary health care centre in Jeddah, Saudi Arabia. Clinical data of sample population was collected within the span of three months. The medical students and interns participating in this research filled the data in written questionnaires. Respondents were offered a reasonable range of answers, and they were asked to select the most suitable answer from 5-point scale, ranging from 0/1 (never) to 4/5 (very frequently). Questions included in this research covered crucial areas of life including physical, mental, and social health, along with general life condition of respondents. The data collected from research participants was filled with an electronic version of the questionnaire and converted into Microsoft excel worksheet. It was then analysed through SPSS. Data were categorised based on age groups of the sample population.

The research was performed after acquiring ethical approval from the Institutional Review Board (IRB) in KAUH, Jeddah, Kingdom of Saudi Arabia. The ethical guidelines concerning the use of human participants in research (i.e. informed consent, confidentiality, privacy, no harm, voluntary participation, etc.) were strictly adhered to in this research process. The sample population consisting children with diabetes and their parents were sufficiently informed about the research purpose and verbal informed consent was acquired from the research participants at the time of data collection.

Statistical Analysis: The collected data was entered, coded, and analysed by using SPSS, Version 22. The sample size for this research consisted of approximately 137 children who visited King Abdul Aziz University Hospital (KAUH) and Medical

Clinics in KSA, Makkah Region. The gender wise distribution of the sample population revealed that about 72 (52.2%) respondents were male, whereas, about 66 (47.8%) respondents were females. The statistical analysis was performed to evaluate HRQoL of children and adolescents with type 1 Diabetic (T1DM) in Saudi Arabia. It also aimed to analyse and the impact of this medical complication on the quality of life of their parents. The Spearman correlation was utilised for testing the relationship of problems, which might be faced by a diabetic child at his or her school. The relationship between children's health and the difficulties that they may face were tested with their age levels. In addition, we tested the relationship between parent's quality of life and their children's psychological health.

The Chi-square test was used to test the relationship between gender and diabetes in children and the problems they face due to this debilitating disease. Simple descriptive statistics, such as frequencies and percentages were reported as proportions for qualitative variables, including health, activities, feelings, and the manner, in which the diabetic children get along with other children. The descriptive statistics also included frequencies and percentages related to the quality of life of parents.

3. RESULTS:

	Frequency	Percentage (%)
Gender		
Male	72	52.2
Female	66	47.8
Age		
<9	31	22.5
9-14	74	53.6
>14	33	23.9

255 interviews were carried out for

this research during the time period of three months. The outcomes acquired from analysis have been categorised into following themes.

Child Descriptive Statistics. The descriptive statistics of children presented in table 1 revealed that approximately 22.5 % (n=31) children were less than 9 years old, about 53.6 % (n=74) children were 9-14 years old. On the contrary, 23.9 % (n=33) children were elder than 14 years.

Table 1: Descriptive Statistics of Children

	Frequency	Percentage (%)
Parent/ Guardian		
Father	18	15.7
Mother	96	83.5
Sister	1	0.9

Table 2: Descriptive Statistics of Parents

The descriptive statistics of parents are presented in table 2. These statistics presented that approximately 15.7% (n=18) respondents were fathers children with diabetes. On the other hand, approximately 83.5% (n=96) respondents were mothers children with diabetes, whereas, 0.9 % (n=1) respondent was the sister of one of the considered diabetic child.

Physical Performance. Approximately 5.1% of patients with T1DM reported difficulty in walking for one meter, whereas, about 51.4% never had trouble. About 43.5% patients reported that they never experienced difficulty in running and about 26.1% of patients reported difficulty in performing sports activity or physical exercise. Similarly, approximately 5.1% of the research participants reported low energy and easy fatigability. On the other hand, 3.6% children were found to ever complaining episodes of body aches. The American Academy of Pediatrics (AAP) recommends that all children, including those with DM, must perform at least 60 minutes of daily physical activity. Children must start physical exercise from the age of 5 years (Hoey et al. 2001). Figure 1 represented that approximately 5.1 % respondents reported to usually suffer from low energy levels, 39.9 % reported to frequently experience low energy levels, and 32.6 % reported to never experience low levels of energy.

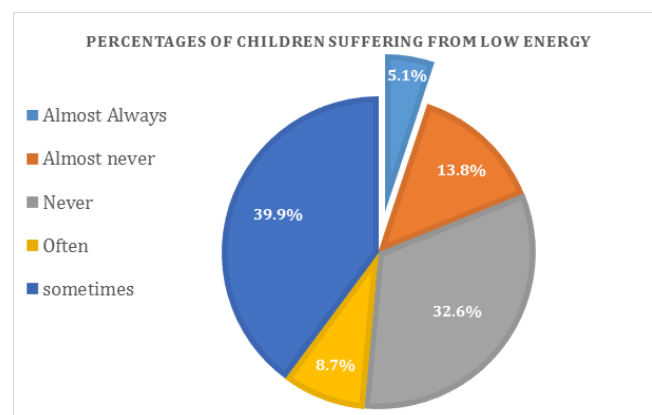


Figure 1: Percentages of children suffering from low Energy

School Performance. Approximately 0.7% of children with T1DM reported that they face difficulty in their studies. About 28.3% of patients reported to miss school due to health deterioration because of diabetes. Moreover, approximately 27.5% of

patients reported to miss school due to hospital scheduled visits.

Relationship between Children's Sleeping Trouble and School Problems. The statistical analysis revealed a positive significant relationship between children sleeping trouble and school problems. The statistical analysis for analysing the relationship between children's sleeping trouble and school problems has been presented in table 3. The statistical analysis revealed that children who never suffered from sleeping problems had not reported having attention problems at class (p-value= 0.018, $\rho = 0.203$). The statistical analysis also revealed that children who had not faced sleeping problems had not reported to forgot things (p-value= 0.005, $\rho = 0.241$). The research outcomes also declared that without experiencing sleeping problems, children also reported to had no trouble in keeping up their school work (p-value= 0.0001, $\rho = 0.296$). Children having no sleeping trouble were also reported to attend school regularly and were not reported to miss school because of their illness (p-value= 0.041, $\rho = 0.175$).

		Correlation Co-efficient	(p-value)
Trouble sleeping	Hard to pay attention in class	0.203	0.018
	Forget things	0.241	0.005
	Miss school because of not feeling well	0.175	0.041
	Miss school to go to the doctor or hospital	0.045	0.603

Table 3: Relationship between Children's Sleeping Trouble and School Problems

A positive significant relation was found between child's running problems and the problems associated with the interaction of children with others. Children who never suffered from running problems did not complain about the behaviour of other children (p-value= 0.009, $\rho = 0.222$). Children who had faced running problems also reported facing ambiguities in accomplishing tasks, which can be performed by other children of their age group (p-value= 0.0001, $\rho = 0.523$). Children suffering from no running problems also reported facing no ambiguities while playing with other children (p-value= 0.0001, $\rho = 0.570$). Those children who never suffered from running problems were reported to have no trouble in getting along with other children (p-value= 0.0001, $\rho = 0.406$). Moreover, it was also found that these children had never experienced unfriendly behaviour from other children (p-value= 0.0001, $\rho = 0.353$).

The statistical analysis revealed a positive significant relation between low energy levels experienced by children and problems faced by them in getting along with others. It was found that children who either had experienced less or had never sometimes or never had low energy never had trouble or problems getting along with other kids (p-value= 0.040, $\rho = 0.176$). The research outcomes also revealed that children who had never experienced low energy levels never felt that they

were not able to perform activities similar to other children of their age (p-value= 0.004, $\rho = 0.244$). Moreover, children who had never experienced low energy levels were never reported to hesitate while playing with other children (p-value= 0.001, $\rho = 0.275$). Similarly, an almost significant relation was found between children who had never experienced low energy and children who had not experienced unfriendly attitude from other children (p-value= 0.052, $\rho = 0.167$).

The research outcomes also revealed the presence of a positive significant relationship between child's low energy and problems faced by children at school. Children who sometimes or never showed low energy never suffered from attention problems at school (p-value= 0.018, $\rho = 0.203$) and never had trouble keeping up with their schoolwork (p-value= 0.001, $\rho = 0.286$). Moreover, an almost significant relation was also found between children who had never experienced low energy levels and who had never reported to forget things (p-value= 0.057, $\rho = 0.163$). On the contrary, no significant relation was found between the children missing school because of not feeling well (p-value= 0.064, $\rho = 0.159$) and children missing school because of having appointment with physicians (p-value = 0.165, $\rho = 0.119$). The p-values and the values of correlation coefficients are represented in table 4.

		Correlation Coefficient	(p-value)
Low energy	Trouble getting along with other kids	0.176	0.040
	Other kids do not want to be my friend	0.167	0.052
	Other kids tease me	0.004	0.962
	I cannot do things that other kids my age can do	0.244	0.004
	Forget things	0.163	0.057
	Miss school because of not feeling well	0.159	0.064
	Miss school to go to the doctor or hospital	0.119	0.165

Table 4: Relation between children's low energy levels and school problems

Figure 2 represent the relationship between the ability of parents to focus and the troubles which might be faced by diabetic children to deal with their school work. The research outcomes revealed that approximately 40 % of parents believed that ability of parents to focus almost never give rise to trouble for diabetic children.

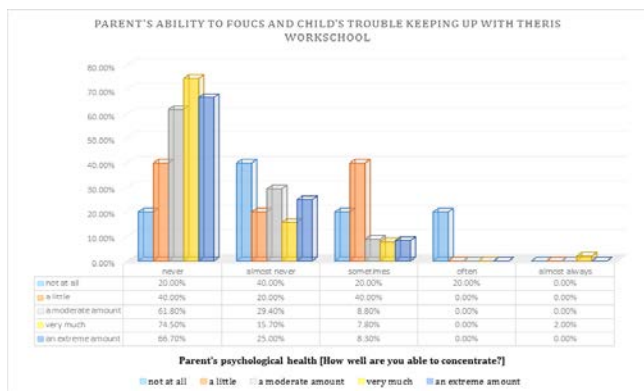


Fig-

ure 2: Psychological health of Parents

The Relationship between Parent's Feelings, Children's Feelings and School Problems. Table 5 represented that there was a positive significant relationship between parent's negative feelings (depression, anxiety mood swings) and negative feelings of children. It was found that children were not reported to be afraid or scared if their parents experienced no negative feelings (p-value= 0.040, $\rho = 0.190$). The research outcomes revealed the most significant relationship between mood swings experienced by parents and bad mood of children (p-value= 0.058, $\rho = 0.176$). Moreover, an almost significant relation was also found between parents who reported to not suffer from negative feelings and children who had not reported to feel angry (p-value= 0.058, $\rho = 0.176$).

The research outcomes also revealed a negative significant relationship between the psychological health of parents and school problems experienced by children. Children who had reported to face no problems at school belonged to parents who had not been suffering from psychological health (p-value= 0.005, $\rho = -0.260$). The research outcomes also revealed no significant relationship between the ability of parents to focus on their children and the absenteeism of children because of ill health (p-value= 0.157, $\rho = -0.132$) or because of having the appointment with doctor (p-value= 0.909, $\rho = 0.011$). Figure 1 demonstrated the of research participants re-

garding the relationship between the negative feeling of parents and negative feelings experienced by children.

		Correlation Coefficient	(p-value)
Parent's negative feelings - blue mood	Child feel afraid or scared	0.190	0.040
	Child feel sad or blue	0.176	0.058
	Trouble sleeping	0.151	0.103
Parent's psychological health - ability to focus	Hard to pay attention in class	0.260-	0.005
	Forget things	0.260-	0.005
	Have trouble keeping up with my schoolwork	0.260-	0.005
	Miss school because of not feeling well	0.132-	0.157
	Miss school to go to the doctor or hospital	0.011-	0.909
Parent's psychological health - physical environment	Hard to pay attention in class	0.044-	0.635
	I forget things	0.015-	0.872
	Trouble keeping up with my schoolwork	0.100-	0.274

Table 5: The relations between parent's feelings, children's feelings, and school problems

Figure 3 demonstrates negative feelings experienced by parents and children. It was found that approximately 53.6% parents reported that they never experience stress and depression because of having diabetic children. Similarly, 54.30 % parents reported that quite often they experience negative feelings while caring for their diabetic children.

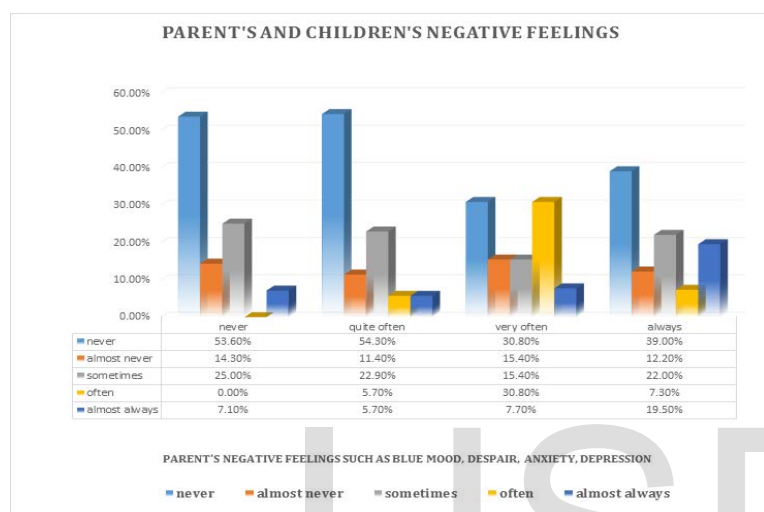


Figure 3: Negative feelings of Parents and children

4. DISCUSSION. This research aimed to evaluate the HRQoL in T1DM patients residing in the metropolitan region of Jeddah. This research also aimed to analyse the extent of effect the disease has QoL of patients and on parents of these patients. This research also analysed the impacts of this medical complication on daily living of children. Diabetic children included in this research were under the clinical supervision of Professor Dr. Abdulmoein Agha and had regular follow-up appointments. The patients were also asked to provide data related to self-monitoring of blood glucose levels and data acquired from the assessment of HbA1c in the past months. In the light of pre-defined inclusion criteria, it was assured that all research participants had been diagnosed with T1DM for more than six months and also had received more than three daily injections of insulin.

The data analysis for this research was carried out by examining the total quality of life scores of patients along with the examination of physical and psychosocial functioning subscales. This research was carried out to find the manner in which the disease was compromising health and well-being of the research participants. The measures included in this research were related to the physical, psychological, and social functioning of children along with the impact of this disease on quality of life of parents of these children.

The PedsQL™ Diabetes Module has been utilised in few studies, which were focused towards paediatric patients with T1DM. Most of these researches were carried out in the United States (US), Europe, Middle East. The research conducted by considering the sample population belonging to only one region cannot be considered representing the population of adolescents with T1DM in every nation. However, the research carried out in any region of the world can provide profitable understanding into HRQoL for the diabetic children. The outcomes of previous researches revealed that when HRQoL score was examined among different countries, it was found that this score ranged between 59.2 and 73.8 in majority of countries. Most minimal scores were associated with the regions of Iran and Greece, whereas, high scores were found for the regions of Sweden and Italy and the US. The number of diabetic adolescents in Saudi Arabia was lower than the total scale scores of the diabetic children and adolescents in other countries (Abdul-Rasoul et al. 2013). Considering the context of diabetes module, the age of patients is considered as one of the most significant predictors of QoL. With the advancement in age, the diabetic children gradually become able to manage their disease independently and effectively. For this reason, it could be concluded that adolescents can manage diabetes in more efficient manner, as compared to young children (AlBuhairan et al. 2016).

In this research, the relationship between the health of diabetic patients and the levels of difficulty, which might be faced, were correlated with their age levels. The statistical analysis revealed that approximately 22.5% (n=31) children were under 9 years old, 53.6% (n=74) children were between 9-14 years old and about 23.9% (n=33) children above 14 years of age. The research outcomes revealed a significant relationship between age levels of T1DM patients and difficulty faced by them in performing activities of daily living. It was found that young diabetic patients might consider it difficult to lift heavy loads and taking shower; however, the levels of difficulty might be reduced with the advancement in age. The research outcomes are similar to the outcomes of the population-based research carried out in the year 2014, which represented that adolescence (13-18 years) had better HRQoL as compared to children (5-12 years) (Naughton et al., 2014). Outcomes of another research also confirmed that early teens (13-15 years) had better QoL than late teens (16-18 years) children (AlBuhairan et al. 2016).

The health conditions and activity levels of the diabetic patients were found to vary based on the gender of patients. Analysing in terms of physical and social functioning and mental health, female patients were found to have worse HRQoL. The research outcomes revealed that approximately 43.9% of female patients reported that they can walk more than one block easily. On the contrary, approximately 24.2% females reported having trouble in walking more than one block. Moreover, only 6.1% females declared that they feel extreme difficulty in walking more than one block difficult. When difficulty in walking was analysed among male respondents, it was found that male T1DM patients experience less difficulty in walking as compared to female T1DM patients. Approximately 56.3 %

of male respondents reported that they can walk more than one block easily, about 23.9% male T1DM patients reported to experience difficulty in walking more than one block frequently, whereas, only 5.6% males declared to face difficulty in walking.

The ability to run was also found to vary between male and female T1DM patients. The research outcomes declared that about 49.3% males and 34.8% females reported feeling no difficulty in running. Moreover, about 29.6% males and 28.8% females reported to frequently have trouble in running, whereas, only 9.9% males, and 9.1% females declared it difficult for them to run. The research participants were also asked about the impacts of T1DM on their sports activities. The research outcomes declared that approximately 46.5% males and 42.4% females reported feeling no difficulty in performing physical exercise. Moreover, about 26.8% males and 27.3% females reported to frequently experience difficulty in performing physical exercise.

On the contrary, only 7% male and 4.5% female T1DM patients reported that they could not perform physical exercise because of their illness. The research participants were also asked about the impact of T1DM on their ability and strength of lifting heavy objects. The research outcomes declared that about 52% male and 45.5% female research participants reported lifting heavy objects easily. On the contrary, 14% male and 19.7% female T1DM patients reported that sometimes they could not lift heavy objects. The research participants were also asked about their ability to lift heavy objects. The research participants were also asked about the impact of T1DM on their ability to perform the activities of daily living. The research outcomes declared that 72% male and 63.6% female respondents declared that despite suffering from T1DM, they are able to perform their activities of daily living.

These findings are similar to the findings of research conducted by AlBuhairana et al. (2016) and Naughton et al., (2014). More recent study performed in Kuwait in the year 2013, also declared that male T1DM patients reported having better QoL, while females appeared to have much more diabetes-related stress. Moreover, it was also found that females tend to take responsibility towards their illness disease earlier because they experience puberty earlier than males (Abdul-Rasoul et al. 2013). The reason behind low QoL among female T1DM patients in Saudi Arabia is still unclear. In the light of outcomes of previously published researches, the female adolescents in Saudi Arabia are more prone to obesity as compared to males. Moreover, lack of exercise and hormonal changes during puberty can also be considered as the factors decreasing the QoL of female patients (Mahfouz et al. 2011; Al-Hayek et al. 2014; Naughton et al. 2014). The outcomes of another research also demonstrated that Saudi female adolescents were reported to experience more depression as compared to males (AlBuhairana et al. 2015). The previously published research also reported that reduced parental involvement and self-care autonomy are the factors leading towards poor self-care, and the management of illness of the diabetic patients. It was also found that reduced parental involvement might also reduce the quality of life of the T1DM (AlBuhairana et al. 2016).

The research outcomes demonstrated that about 40.9 % of the considered research participants reported having good quality

of life; however, approximately 32.2% research participants failed to declare their either poor or good quality of life. Moreover, about 19.1% sample population reported leading poor quality of life. Outcomes of this research are contradictory to the outcomes of research conducted in the region of Kuwait, which stated low QoL scores in the emotional and physical domains (Abdul-Rasoul et al. 2013). That report also mentioned that social and cultural factors and support from extended family had assisted diabetic children to interact with peers and other individuals within their social circle.

Parents play a significant role in the treatment of their children's T1DM (specifically, the parents of younger children). For this reason, this research also investigated psychological, health, social, and mental status of satisfaction of parents. Mothers and fathers of children and adolescents with T1DM meeting the inclusion criteria were recruited from KAUH hospitals. In the light of responses acquired from parents of T1DM patients, it was found that most of children had good health, and diabetes had not affected their daily activity. It was also found that this illness had also not reduced the quality of social life of these children. Approximately 15.7% fathers, 83.5% mothers, 0.9% sisters of the diabetic children participated in this research.

The previously published literature demonstrated that mother of children suffering from T1DM had lower QoL scores as compared to father of these children. It was also declared that mothers usually spend more time in caring their diabetic child and are responsible for medications of these children. For this reason, mothers of young T1DM patients were reported to have low QoL scores (Arafa, Zaher, El-Dowaty, and Moneeb 2008). Contrary to the outcomes of previous studies, this research had not found any significant relationship between gender and QoL. Moreover, studies from literature suggested that T1DM in children and adolescents has little effect on family affinity; however, although it is most often associated with a negative effect on the psychological well-being of parents children with diabetes (AlBuhairana et al. 2016).

Outcomes of this research reported that about 27.8% of parents reported to had negative mood, and 24.3% of parents reported to have no impact on disease of their child on their mood. In this regard, the outcomes of this research are also supported by the previously conducted research. The research was carried out by considering parents of paediatric patients suffering from asthma, cystic fibrosis, cancer, and T1DM. The research outcomes reported that parents of paediatric patients with T1DM experience more levels of anxiety and stress; however, these parents were reported to experience less stress over the well-being of their children (Hullmann et al. 2010). Another case-control study demonstrated that parents of children suffering from diabetes were found to experience more stress as compared to the stress experienced by parents of non-chronically sick children (Arafa, Zaher, El-Dowaty, and Moneeb 2008). Parents might feel it difficult to cater the needs children with diabetes, because of eating habits of other family members (Mellin, Neumark-Sztainer, and Patterson 2004).

The anxiety levels of parents of children with diabetes were found to have association with the expanded uneasiness of parents, diminished expectations, and reduced levels of self-adequacy (Lewin et al. 2005; Mitchell et al. 2009). The impact

of having diabetic child was reported to have negative effect on the psychological health of parents. However, some parents also emphasised on positive points of having a diabetic child. In the light of responses acquired from parents of children with diabetes, it was found that caring for the diabetic child improved family relations and health habits and had changed the psychosocial profile of family (Mellin, Neumark-Sztainer, and Patterson 2004). The outcomes of this research also declared that about 52.2% of parents are satisfied with their personal relationships, whereas, 13% parents were very satisfied with their personal relationships.

Despite the fact that family framework hypothesis or the value-based model of parent-child communication does not enunciate these advantages, it can be stated that sickness of young family members strongly influences the family from numerous points of view (Tedeschi and Calhoun 1995; Helgeson, Reynolds, and Tomich 2006). The research outcomes also stated that HRQoL decreases because of diversified factors. The research outcomes demonstrated that HRQoL is affected by income status of the family of diabetic patient. Parents reporting to have good quality of life most often have enough money to meet their needs ($P\text{-value} = 0.019$, $\rho = 0.217$).

5. CONCLUSION. The cross-sectional study which was conducted by considering sample population of young children suffering from T1DM. The follow-up period considered in this research ranged from June 2017 to August 2017 and was performed at the outpatient endocrinology clinics of KAUH. The follow-up was carried out with the objective of evaluating the HRQoL of the children suffering from T1DM and the impact of this on daily activities of patients and their parents.

The research outcomes declared some positive and negative significant relations as between the different aspects of quality of life of the T1DM patients. This research was conducted by considering 225 paediatric T1DM patients (52.2% males and 47.8% females) and their parents (15.7% fathers and 83.5% mothers). It was found that P children who never suffered from sleeping problems had not reported suffering from attention problems within the classroom. Children suffering from no sleeping problems were also reported to face no problem in the completion of their school tasks. It was also found that T1DM patients who were not reported to suffer from sleeping problems had not reported to miss school because of their illness. The research outcomes also revealed that T1DM patients, who did not complain about running problems did not face problems in communicating with peers.

On the other hand, those T1DM patients who had low energy levels were reported to face problems in academics and were reported to experience problems in getting along with peers. The research outcomes also declared the presence of negative significant relations between psychological health of parents and school-related problems faced by young children. Negative significant relations were also found between age levels and the number of children experiencing difficulty in performing the activities of daily living. This research was conducted by considering the cross-sectional design, which might be considered as potential limitation of this research. The cross-sectional research design failed to establish causal links. The absence of a control group was another limitation of this research. Despite these limitations, the research outcomes might

contribute to the evaluation of new strategies for T1DM patients.

The research outcomes might also contribute in broadening of multidisciplinary perspectives, ultimately improving HRQoL of diabetic patients along with improving quality of life of parents of the children diagnosed with T1DM. This research had not included the effect of diet, effect of exercise intensity and level of energy expenditure of sample population. Moreover, this research had not include healthy control group to compare physical activity. Similarly, the potential for recall bias with the use of self-reported questionnaires might also have affected the research outcomes. Every society is reported to have unique culture, health care delivery system, and family dynamics. For this reason, it is extremely crucial to understand T1DM consequences independently for every society. Evaluating the QoL of patients in the Saudi Arabian population might contribute to better management and handling of T1DM, a widespread disease in our community. The previously published literature had demonstrated obstacles, barriers, and issues related to health outcomes of T1DM patient; however, further research and interventional studies are required for further improving QoL children with diabetes.

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