The impact of diabetes on children and adolescents in schools, and the difficulties they experience, in Sirte city.

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Abstract

The aims of this observational study are to find the impact of diabetes disease in children and adolescents in schools. The survey conducted from the anticipated students , their parents' , school supervisor and doctors. The difficulties experienced with full integration, to define a series of suggestions, and recommendations to improve their situation.

Parents of children aged 5-18 years with diabetes were eligible. Those who agreed to take part in completing of a self-reporting questionnaire which determined the effects of the disease on children, based on three aspects; as the survey divided into three parts: - Patient information, Information about diabetes and how to deal with it, and the factors that are the cause of the disease.

A total of 35 questionnaires were completed and validated, 7 diabetic students refuse to fill up the questionnaires'. 51% of cases are between 15 to18 years old and 60% of them are females. The majority of parents believed that teachers could recognize the symptoms of a mild hypoglycaemic episode. It may help by increasing awareness about the disease. Because their peers think that diabetic is a contagious disses. The school health office is not present in all institutions. Training sessions on Type 1 diabetes, through increasing the number of nurses. The Best availability of resources from disease associations to schools and improved communication between school personnel and parents. Were identified as key factors that may improve the full integration of the diabetic child in this setting. Reopen the health office, which they could bring much help to the diabetic student and another infection.

Keywords

Adolescents, children, diabetes mellitus, Beta cells, hyperglycaemia.

Introduction:

Diabetes are a group of metabolic diseases, which are increased sugar (glucose) in blood and urine; due to persistent deficiencies in insulin secretion, insulin action, or both. Sugar is produced by digesting carbohydrates and converting them to glucose. This sugar represents the fastest component to gain energy. When glucose is built up from metabolism in blood, it enters the cells to obtain energy. To finish this action the insulin hormone is necessary; cause it functions to introduce the sugar in cells. Unfortunately, in diabetes

patient, the sugar will accumulate in the blood due to an insufficient amount of insulin hormone or does not work at all. In case of present of ketones in blood or in urine. The urgent treatment is required due to the rapid increase in ketoacidosis. The three main signs of diabetes are polyuria, polydipsia, ketonuria [1].

The Insulin is a protein hormone secreted from scattered cells called Langerhans islets, in the pancreas. There are a three types of islet cells; Alfa ones which secretes the glucagon classified as a hyperglycaemic hormone. The beta-cells secret the insulin classified as a hypoglycaemic hormone. And the delta cells secrete chemical messenger like, to the direct cells, which works to increase blood glucose level [1]. Insulin significance is as follows:

1 - Sugar metabolism: works to store glucose in the liver and muscle.

2- Fat metabolism: works to convert free fatty acids to neutral ones.

3- Protein metabolism: The conversion of amino acids to protein and prevent the opposite.

The deficiency in the secretion of insulin hormone. When beta cells are infected because of the inability of the body to reduce the level of glucose and thus increase a concentration of glucose in the blood. , and therefore cause the potential emergence of specific symptoms of diabetes. Diabetes mellitus which means to increase sugar in urine, known too as Glycosuria. Another type of disease called Insipid us diabetes this usually caused by a problem in the pituitary gland or kidneys, that rare one.[2]

Diabetes mellitus types:

1 - Diabetes type 1: This type typically appears in childhood and youth. But it appears at any age. Because of beta-cell breakdown, which is responsible for producing insulin, where they are attacked as foreign bodies by immune cells (T-cell) .[3]. It forbids them from manufacturing insulin hormone, which works to reduce blood sugar. This is a type also known as insulin-dependent sugar with a commitment to exercise. Patients usually consider an ideal weight, and insulin ratio is moderate, but they typically develop insufficient weight. Also increased ketone causes increased urination with rapid and deep breathing with vomiting, nausea and colic in the abdomen, aggressive behaviour or hallucinations [3]. According to the American Diabetes Association, the percentage of teenagers with immune-mediated kind 1 diabetes who's overweight is increasing. As many as 24% can be obese at the time of analysis. Kids with immune-mediated diabetes commonly have a short length of signs and symptoms and frequently have ketosis; 30–40% has ketoacidosis at

presentation. After metabolic stabilization, they will have an initial length of faded insulin requirement, and then they require the hormone for survival and are at chronic risk for ketoacidosis [4].

2- Diabetes type 2: This type predominantly occurs in people more elderly than 40 years and sometimes the patient has diabetes for a period of time but may not experience it. But according to recent reports of the emerging problem of type 2 diabetes in children and adolescents .In most cases, this type is accidentally discovered and treated with diet or pills, but over time people need insulin therapy. It is the resistance of cells to insulin or that cells do not receive insulin naturally with a relative lack of insulin secretion. Leads to a deficiency of tissue response to insulin due to a defect in the insulin receptors of the cell membrane leading to the accumulation of insulin hormone in the blood. It is usually caused by abdominal fat, especially the central region; and family history [6].

The patient with this kind is treated by some drugs that increase the sensitivity of insulin cells or reduce the production of glucose in the liver. But if the patient continues forgetting to take the medicine. These drugs act on insulin receptors or stimulate the secretion of insulin in the pancreas. The patient may have to take insulin injections. Following a diet as well as exercise improves your risk of reducing this type of diabetes; drought is rare due to the patient drinking a massive amount of water in type 2 diabetes [6].

Diabetic patients' metabolism:

In diabetes, food is digested in a natural way and converted into fundamental components like glucose and fatty acids. This provides energy for various activities of building and growth, which represent the fastest component of energy intake. When the glucose sugar produced by the metabolism of the blood. Insulin is released from the beta cells of the pancreas, to introduce sugar into the cells. But as a result of insulin deficiency it does not work effectively, glucose cannot be disposed of by urine [7].

The organs that cooperate to regulate blood sugar:

1 - Pancreas: Through the secretion of the hormone insulin. The pancreas is a gland located at the top of the abdominal cavity between the liver and stomach and the beginning of the intestines. The cover is connected to the tube. Open in the Twelve. The function of intestinal secretion is to digest all digestive enzymes to convert nutrients into simple substances for easy absorption. This is the central part of the pancreas. Another function is the secretion of hormones directly into the blood. Which is excreted from a group of distributed cells known as Langerhans. Their secretions are insulin to

reduce blood glucose and excrete from beta cells, and lack of causes of diabetes. While the other hormone elevates glucagon in the blood sugar and is excreted from alpha cells [7].

2. Kidney: Glucose is absorbed from the renal tubules and returned to the blood in a healthy person, by active transport of glucose and glucose. But in diabetes, there is much glucose in the renal tubules exceeds the average range; caused high water absorption, osmotic diuretic. Glucose is opposed to the re-absorption of waterproof fertilizer, and a massive amount of water is passed in the urine. As a result, urine, dehydration, and thirst represent a characteristic feature of diabetes [7].

Disease causes:

1-Genetically: The genetic factor to the immune system, was found to be first-degree relatives with 15%. While the percentage is 4% if the mother is infected. The percentage increases if both parents are infected by 30%. In twins, the ratio increases to about 50%. Compared with twins, they are similar to about 10-19%. Despite these percentages, the genetic factors of the disease are not completely known. Children with immune-mediated type 1 diabetes, 5% have a first or 2nd-degree relative with the identical disease.[8].

2- Epidemiology:

a-Poor feeding: It was found that malnutrition and its full dependence on carbohydrates and lack of protein intake reduce the body's mass which consumes the most considerable amount of energy. Blood sugar accumulates.

b- Other disease infections: According to the World Health Organization (WHO). A number of the virus infections caused diabetes; some viruses may increase the risk of diabetes especially poliomyelitis. So some viral diseases can break down beta cells responsible for insulin production in theory. But they found that the injury was low in people who were in intensive care [10,11].

c- Chemical exposer: According to The National Institute of Environmental Health Sciences (NIEHS) and National Toxicology Program (NTP). The chemical enters the body by using plastic products containing a material that can disrupt the functioning of hormones. Leading to the risk of many diseases including diabetes, obesity and cancer. The bloodstream through the skin especially wet. A sampling blood and gonorrhoea are a quick absorption of this entry. Such as bisphenol A or BPA This leads to the concentration of diabetes according to the organization [9,10].

Symptoms of treatment neglect:

Increased sugar and carelessness can accumulate ketoacidosis. Which in turn lead to the coma of hyperglycaemia. Complications of the disease have a negative effect on most body organs. Mostly kidneys (nephrons), retina, nerves, especially the limbs of the foot, delayed healing wounds. Therefore, the patient is vital to know taking medication every day, and follow the measurement of blood sugar frequently is crucially important for their health. As result not to form the bodies of ketones that cause coma or death. Diabetes was rated as significantly harder to treat than hypertension as it has many effects all over organs [11,12].

Results and Discussion:

The questionnaire was distributed through 37 schools with combined number of students was 18,758, at Sirte and Abu-hadii, the response rate was remarkably good. The figure show that 35 students participated between males and females. Seven students do not agree to participate in study. The questionnaire was conducted by the students, their families, and the school social workers.

A number of questionnaire papers were distributed to all schools in Sirte and Abu-hadii.

Patients' responses to the first part of the questionnaire were as shows in figure 1: The figure 2 shows that number of males less than females 40% and 60% respectively. And the considerable infected age of students were between 14 to 18 at 47%. More than a half of participated diagnosed by disease symptoms at 57%; whereas 29% diagnosed by coincidence and 14% by periodic detection (figure 3). The figure 4 illustrates 77 percentage of their opinion the reason for the disease represents a coincidence, while 23% determine a genetic cause. A significant proportion of diabetic students their studies level approximately two-thirds of them ranged medium; whereas the rest of them were high level at 36%. In spite of that, the number of students that affected by disease is 54%; the majority is feminine gender comparing to 46% are unaffected. Measuring the blood sugar level by themselves or by aid from their parents virtually have the same percentage at 50%. The health office's at school is not present in average.

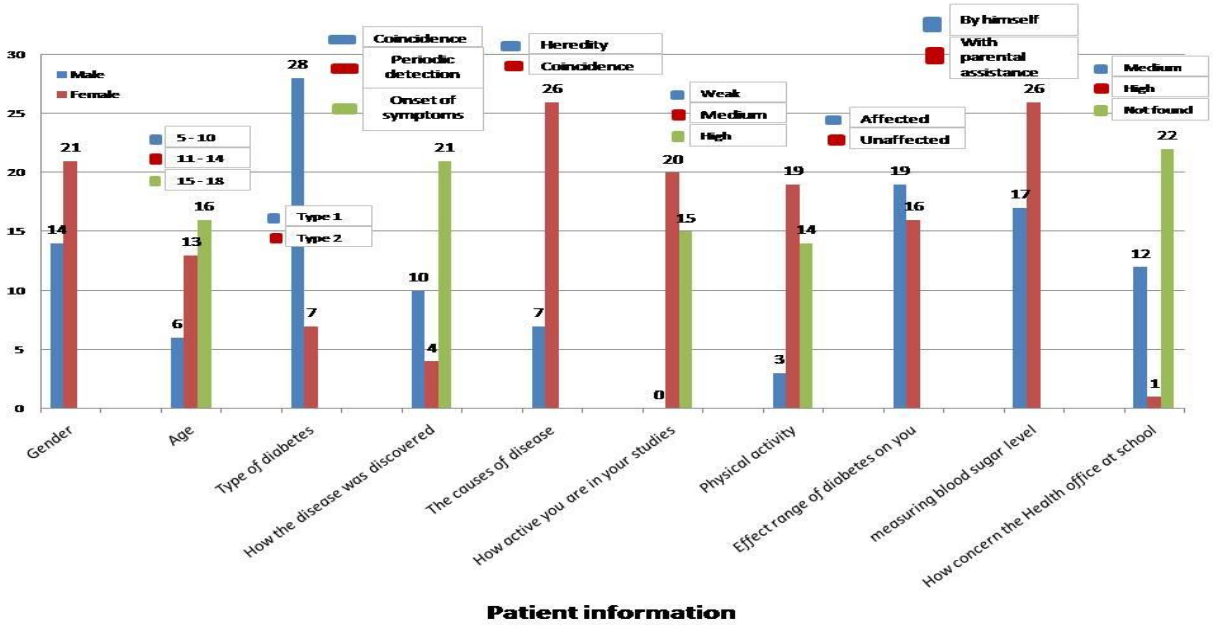

Figure 1: Demonstrate the patents information.

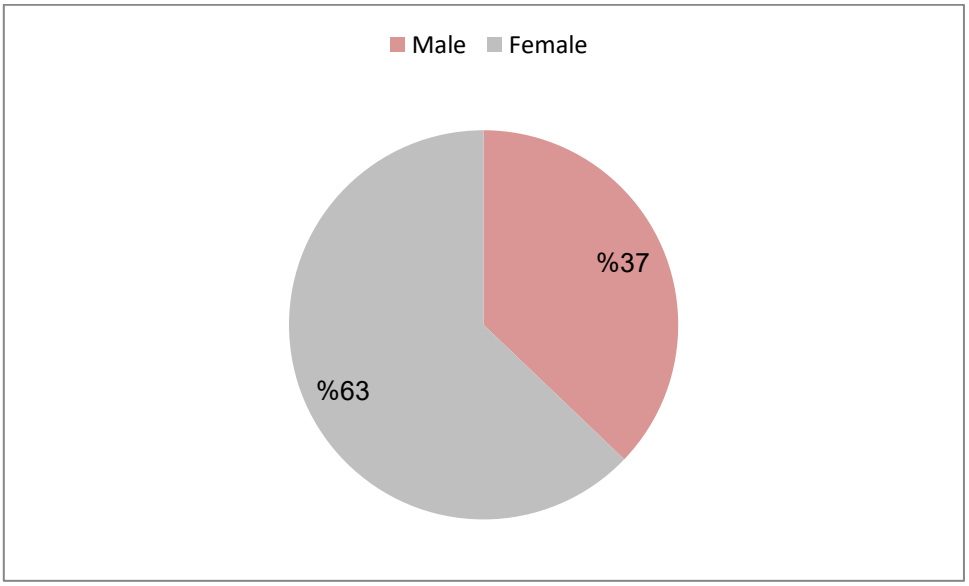

Figure 2: The percentage of diabetes among gender.

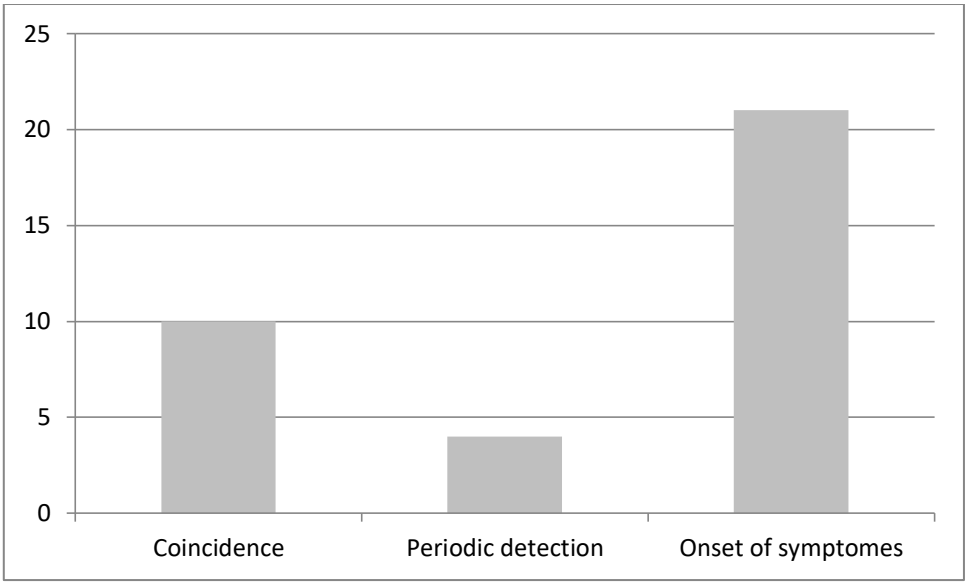

Figure 3: How the disease was discovered

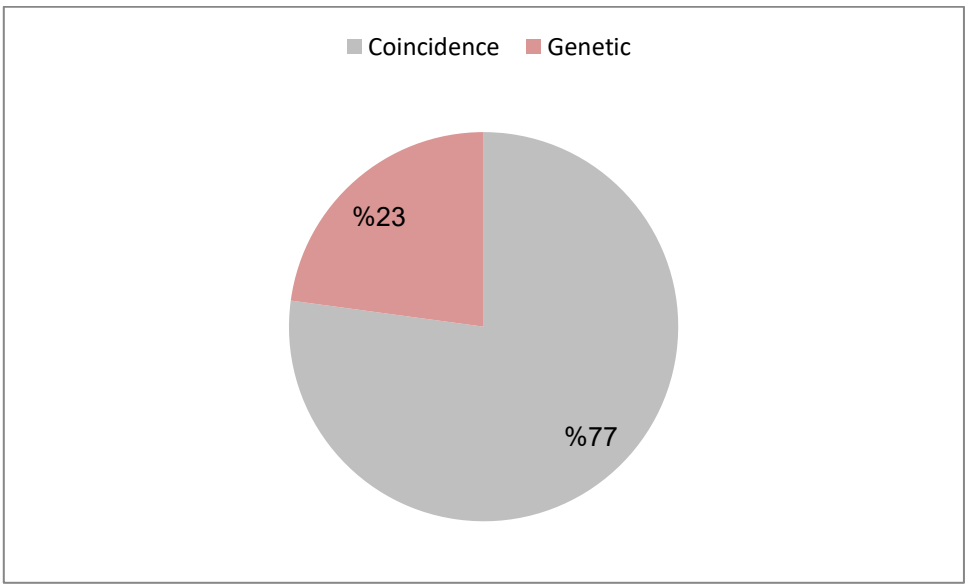

Figure 4: The causes of disease

In the second part of the completed questionnaire considering diabetes cases concerning the specific information on the disease and how to treat as shows in figure 5; the number of diabetics receives information on the disease is bigger with 70% than 30% have not known about it. More than half of sample (58%) report their parents did not have diabetes and 42% they have it. Even though of a shortage of specialist doctors in the city; a large proportion follow-up the specialist doctor is 66%, while just over a third of patients are irregularly visiting their doctors. All patients require medication with insulin injection. Although 55% did not upset from the injection, others at 45% get irritated by it. Figure 6 shows the significant majority 80% have diabetes diet; whereas 20% they did not gain it. In spite of that, the enormous proportion

accepts an adequate diet and become healthier is precisely 64% more than 36% they did not seem any fundamental difference in their case (figure 7). All diabetics typically have aware that it is necessary for them to exercise. The majority of participated admitted hid a diabetic at schools with 51% whereas 49% they did not. According to diabetic parents that they experienced difficulties in school because many students believe that diabetes is a contagious disease; In addition, fighting with diabetics may cause wounds to them as well as high blood sugar level.

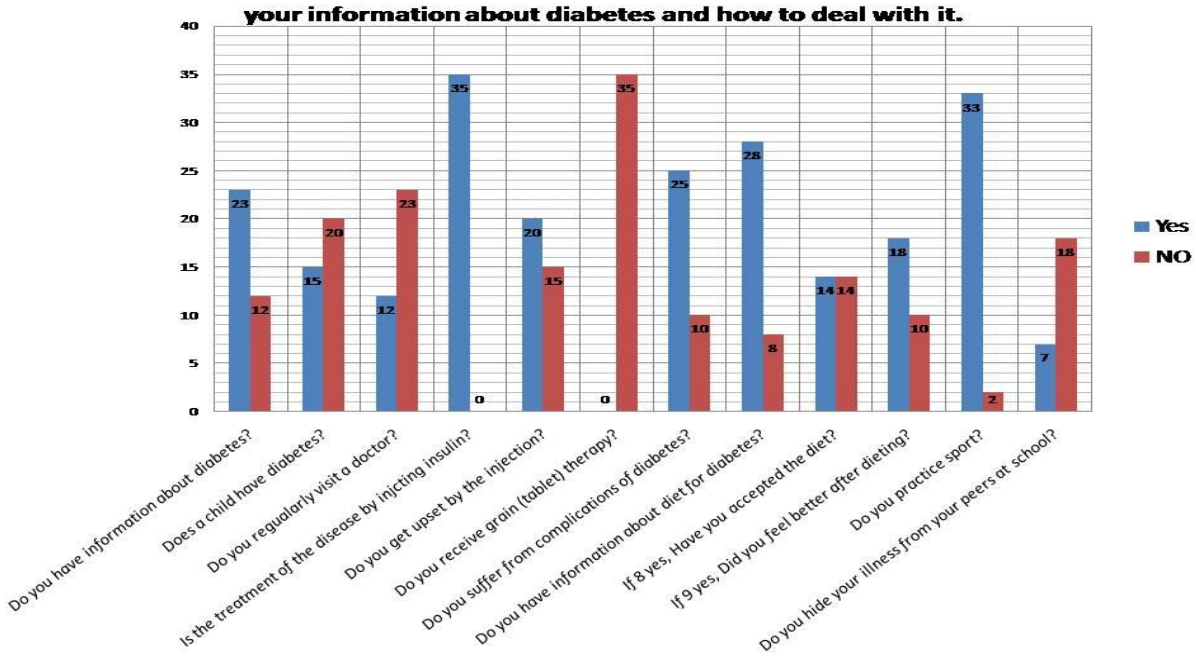

Figure 5: Illustrate the information about diabetes and how to deal with it.

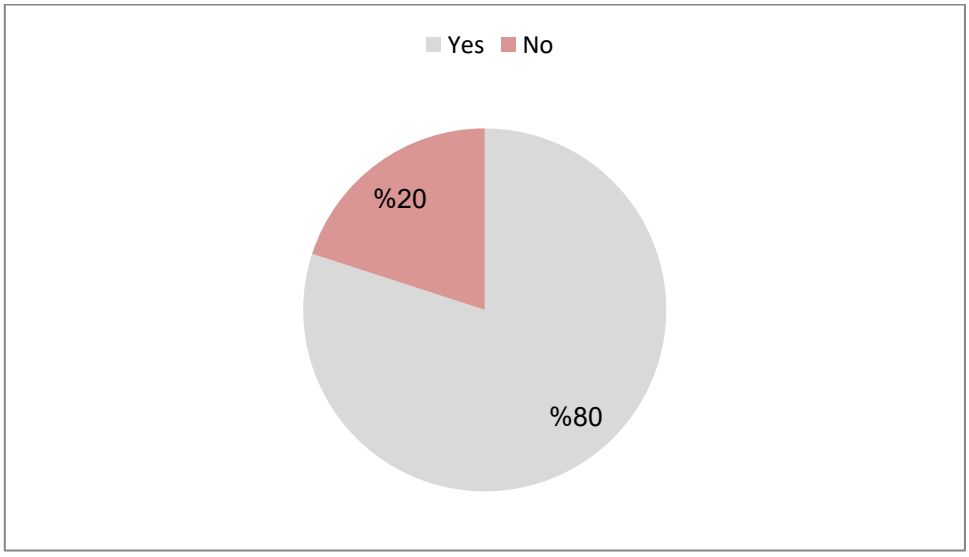

Figure 6: The percentage of information about diet for diabetes they have.

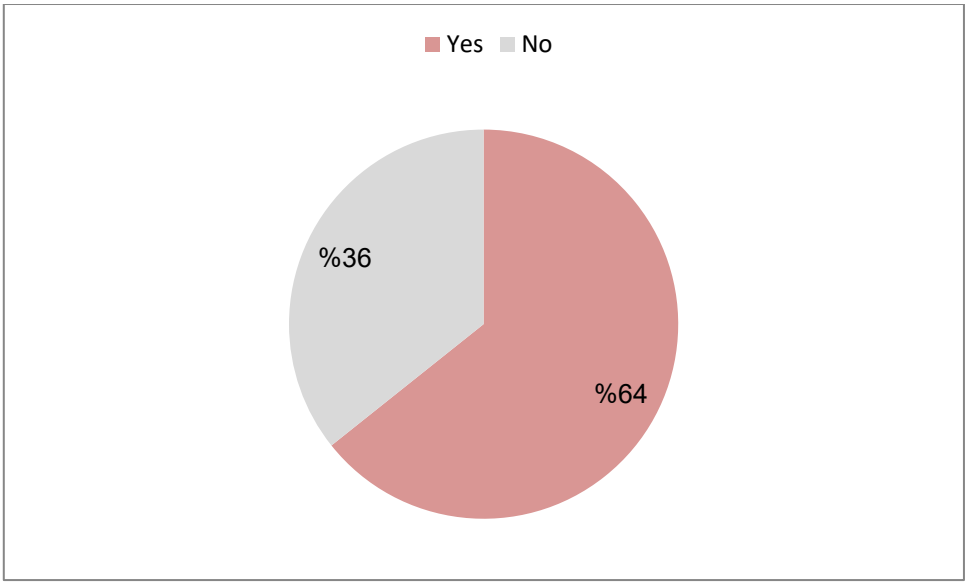

Figure 7: Represented the percentage of a diabetic diet and their health become well.

The last part of the questionnaire is about the factors leads to diabetes as shows in figure 8: Almost more than a half reported that psychological and emotional tensions may rise the symptoms as demonstrates in figure 9. The rest of participation did not have any thought. The genetics causes have the largest percentage at 71%; all factors which are exposed to chemicals, taking some medication and viral disease seems to have the same percentage at 51% did not have knowledge are bigger than 29% they agree that aspect could be a reason of diabetic in future. As reported by the patient parent they do not have diabetes in their families. It is also believed his son has become ill due to antibiotic treatment for a long time due to allergies. Figure 10 illustrates a remarkable percentage be of the same opinion that the obesity and lack of awareness may lead to the disease have at 80%. A vast proportion did not agree (71%) of consuming sugary food could cause diabetes; although almost a quarter they agree it might be a reason.

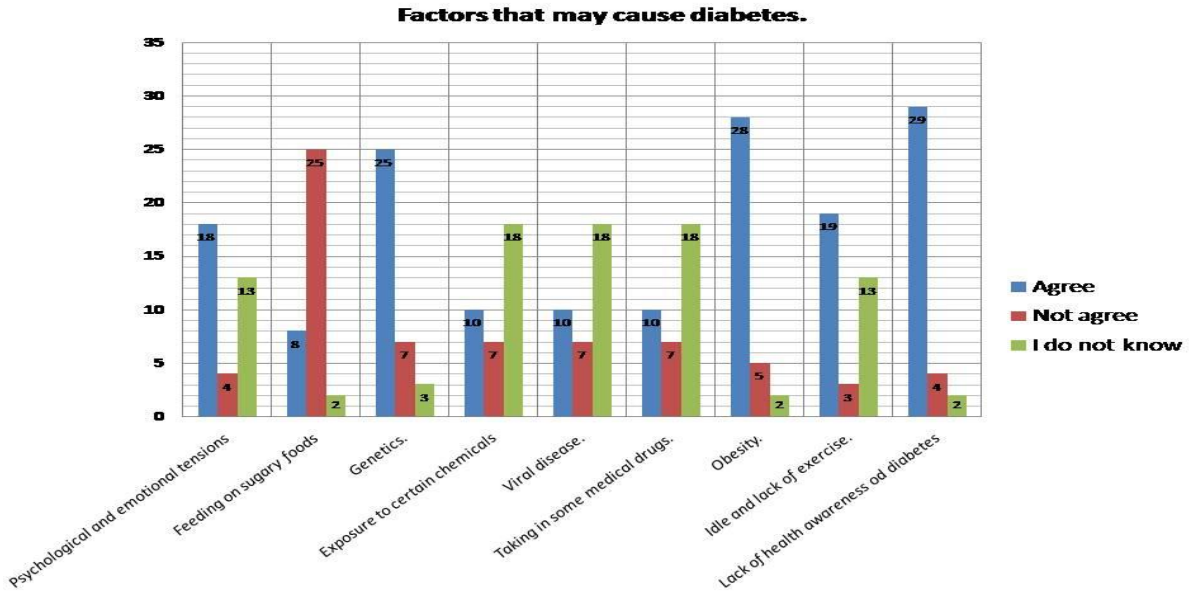

Figure 8: Demonstrate the factors may lead to diabetes.

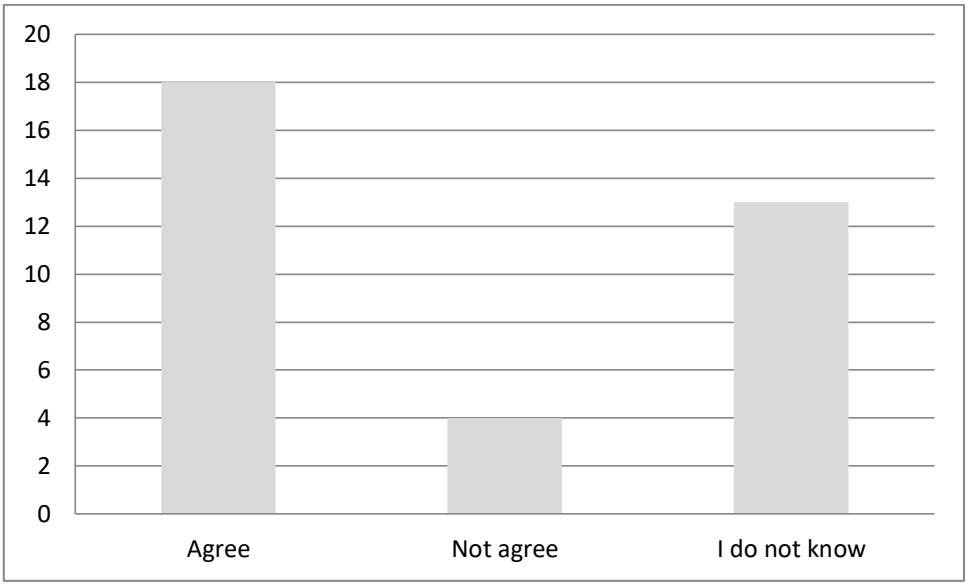

Figure 9: Illustrate the effect of psychological and emotional tensions on diabetes.

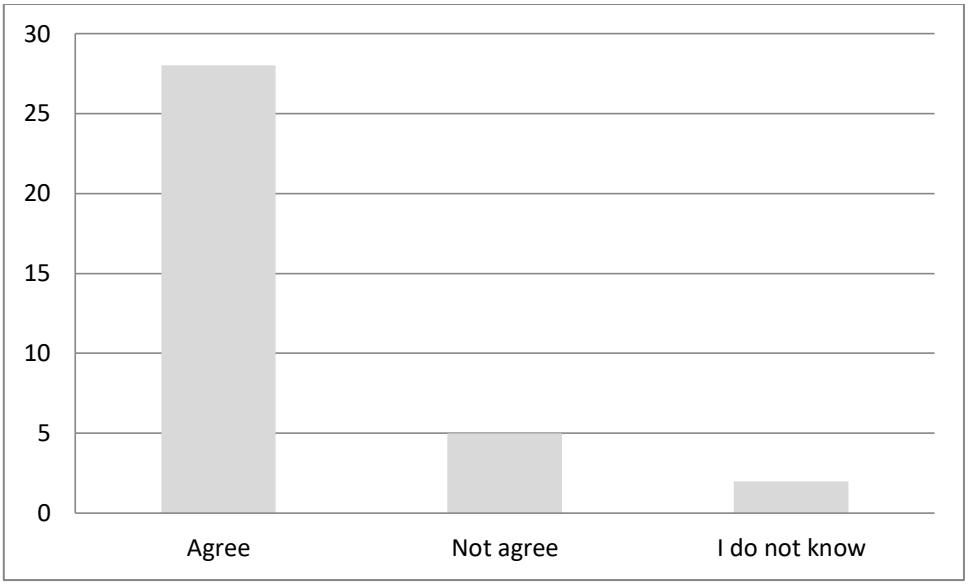

Figure 10 : Show the average of obesity and lack of awareness health could lead to diabetes.

Until these days immune-mediated type 1 diabetes became the most effective sort of disease taken into consideration conventional among children, with only 1-2% of them considered having type 2 diabetes or different uncommon diabetes. [13]. Diabetes may affect children of different age, from infancy up to mature adolescents. Therefore, their biological conditions and reactions to the treatment are changing along with their somatic and psychological development. Diabetic education and/or acceptance of disease experience many barriers depending on the patient's age. The most adolescent children with diabetes cannot fully rationally understand their situation. And are expected to cooperate with parents and/or caregivers by acceptance of glucose measurement and tolerance of personal insulin pump or insulin shots. Obedience to meal regime and activity control. So they are mainly passive in the disease course. The fundamental role of parents or pre-school caregivers depends on precise observations of child's behaviour and flexible reactions to glycaemia results, meals and activity.

Young school children can better understand their illness and cooperate with parental instructions under teacher's supervision. Diabetic adolescents are virtually independent in good as well as in poor diabetes control. They reflect previous parental guidance related to their knowledge, responsibility, accuracy, in their self-control. This life period has its own specific difficulties in course of diabetes due to somatic and psychological maturity.

According to doctors in the Endocrinology Department at Tripoli Children Hospital; Both genders are affected as they stated in as the recorded hospital. The particular cause was genetic factors, gain weight and psychological

tensions all increased the risk of developing the disease. As for children eating sugary foods may cause the disease is not necessarily. Most cases that have been detected to hospital admission due to the high acidity of the blood (ketoacidosis) accuracy consequent to a neglect of receiving medicine or lack of knowledge of parents as infected. The type of medical care used for injecting the basal insulin and the insulin pump for the age of 12 years and above for the latter. The patient weights are low before treatment and after receiving medical care becomes ideal. The specialist believes the rate of health awareness in the community may reduce the risk of disease in the future. They recommend a diabetes management:

1- a low-carbohydrate diet with many proteins divided into servings at various intervals of the day. The most essential is that total nutrient intake is sufficient to balance the whole daily energy consumption. And its temporary variations in order to achieve ideal body weight and sustain average growth and development [14]. The patient's meal plan should include food from every group of products recommended for the daily intake. What is paramount no calorie or carbohydrate restrictions should be imposed in order to achieve low blood glucose levels [15]. To control lipids and lipoproteins in plasma and blood pressure to prevent the risk of vascular disease and also to achieve and sustain required body weight [16]. However, research shows that a diet of adolescents with diabetes type 1 is deficient and does not receive recommendations [17]. Diabetes diet management must consider the exogenous insulin pharmacokinetics and bidirectional programming for meals ingestion and insulin action intervals. Moreover, the meals should be adjusted to concrete activity and expected glucose utilization to avoid energy deficit and risk of hypoglycaemia as well.

2- Another inseparable element of diabetes management. Prolonged physical exercise improves insulin action and lowers the risk of diabetes-related complications [18]. Moreover, body exercise has been found to increase the lifespan of type 1 diabetes patient [19]. According to the guidelines issued by most diabetes institutions, the diabetic youth should be encouraged to perform moderate to intense physical activity lasting at least 60 minutes daily [20]. However, they represent a group with a significant risk of hypoglycaemia during and immediately after exercise (even up to 12 hours) [21]. Nocturnal hypoglycaemia is a fundamental issue with children and adolescents with type 1 diabetes [22]. Although physical activity usually causes a reduction in blood glucose level, in certain circumstances it may lead to hyperglycaemia [23]. Even patients in good

metabolic control may experience hyperglycaemia during and after strenuous exercise [24]. Another explanation is the evident insulin deficit in course of physical activity, which evokes blood glucose decline only with concomitant insulin action. Insulin deficit will limit oxidative glycolysis, will not stop gluconeogenesis and will promote burning fatty acids to ketone compounds. The art of treatment is to identify the particular patient's reaction to exercise, insulin and diet together to manage a proper balance between them.

All these factors help maintain blood sugar levels. Continuing to take treatment and measure the level of sugar in the blood.

Conclusion:

1- 42 cases suffering from diabetes represented among 37 schools from Sirt and Abohadii, where they cooperate with us and most of them fill in the questionnaire.

2- The majority of visiting doctor outside their city caused there is no specialized in Endocrinology except one for adult endocrinology.

3- Children and adolescents with type 1 diabetes manifest changes in insulin different eating behaviour and physical activity patterns according to stages of their development. They are unstable at any time with disease demands and all members of their families, teachers and social workers at schools have to support them. Diabetes management aims most of all to sustaining normal or near-normal blood glucose level to prevent long-term consequences.

4- Diabetic children spend time at school under the care of teachers who, undertaking responsibility for the student's safety, should also feel responsible for the disease management. The way they do this, or if they undertake the task at all, depends not on there but primarily on their understanding of the disease.

Recommendation:

1- The educator should perform the vital role by passing the knowledge of the disease and insulin therapy teachers and students from the child's school. Such an attitude may help provide a protected environment for adolescent patients. Where will they be less discriminated against their peers or excluded from activities. Which frequently takes place because of people's lack of knowledge and fear of the unknown.

2- Reopen the health office in school with a nurse that has an experience with the widespread disease the effect children.

3- Difficulty in following patients with specialists in Sirte due to the lack of specialized doctors in the city.

4- Encourage the GP Doctor to specialize in endocrinology in children.

5- Encouraging diabetes to follow-up doctor

6- Spread awareness among people about the disease:

a- Leaflets and media.

b- Lectures within educational institutions are directed to all students to Inform them about the diabetic disease.

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References:

1- Frank, Marcia R. "Psychological issues in the care of children and adolescents with type 1 diabetes." *Paediatrics & child health* 10, no. 1 (2005): 18.

2- Baylis, Peter H., and Tim Cheetham. "Diabetes insipidus." Archives of Disease in Childhood 79, no. 1 (1998): 84-89.)

3- Harano, Y., M. Ohtsuki, M. Ida, H. Kojima, M. Harada, T. Okanishi, A. Kashiwagi, Y. Ochi, S. Uno, and Y. Shigeta. "Direct automated assay method for serum or urine levels of ketone bodies." Clinica Chimica Acta 151, no. 2 (1985): 177-183.

4- Miculis, Cristiane P., Luis P. Mascarenhas, Margaret Boguszewski, and Wagner de Campos. "Physical activity in children with type 1 diabetes." Jornal de pediatria 86, no. 4 (2010): 271-278.

5- American Diabetes Association. "Type 2 diabetes in children and adolescents. American Diabetes Association." Diabetes Care 23, no. 3 (2000): 381-389.

6- Dabelea, Dana, Elizabeth J. Mayer-Davis, Sharon Saydah, Giuseppina Imperatore, Barbara Linder, Jasmin Divers, Ronny Bell et al. "Prevalence of type 1 and type 2 diabetes among children and adolescents from 2001 to 2009." Jama 311, no. 17 (2014): 1778-1786.

7- Saladin, K.S., Anatomy and Physiology: The Unity of Form and Function, Fourth ed. 2007, New York:McGraw Hill.

8- Craig, Maria E., Andrew Hattersley, and Kim C. Donaghue. "Definition, epidemiology and classification of diabetes in children and adolescents." *Pediatric diabetes* 10, no. s12 (2009): 3-12.

9- Yoon JW, McClintock PR, Onodera T, Notkins AL. Virus-induced diabetes mellitus. XVIII. Inhibition by a nondiabetogenic variant of encephalomyocarditis virus. J Exp Med. 1980;152(4):878-92.

10- Andréoletti L, Hober D, Hober-Vandenberghe C, Belaich S, Vantyghem MC, Lefebvre J, et al. Detection of coxsackie B virus RNA sequences in whole blood samples from adult patients at the onset of type I diabetes mellitus. J Med Virol. 1997;52(2):121-7.

11- Food and Drug Administration. Bisphenol A (BPA): use in food contact application. [Accessed 08/15/2013];2010

12- Neel BA, Sargis RM. The paradox of progress: environmental disruption of metabolism and the diabetes epidemic. Diabetes. 2011;60(7):1838–1848.

13- Krzyśko, Izabela, Sabina Przewoźniak, Bogda Skowrońska, Elżbieta Niechciał, Anna Gertig-Kolasa, and Piotr Fichna. "Type 1 diabetes in children and adolescents–a need for multi-pro-fessional team intervention." (2015).

14- Brook C.G.D., Brown R.S.: Endokryno¬logia pediatryczna. Elsevier Urban & Partner, Wrocław 2013.

15- Suskind D., Lenssen P.: Algorytmy żywienia dzieci. Elsevier Urban & Part¬ner, Wrocław 2013.

16- Diabetologia Kliniczna 2013, t. 2, supl 2013, t. 2, supl. A.: Zalecenia kliniczne dotyczące postępowania u chorych na cukrzycę, 2013. Diabetologia Klinic¬zna, 2013, 3-52.

17- http://www.cdc.gov/diabetes/risk/age/ youth.html.

18- Galassetti P., Riddell M.C.: Exercise and type 1 diabetes (T1DM). Compr Physiol., 2013 Jul:3(3),1309-1336.

19- Moy C.S., Songer T.J., LaPorte R.E. et al.: Insulin-dependent diabetes mellitus, physical activity, and death. Am. J. Epidemiol., 1993 Jan 1:137(1), 74-81.

20- Kenneth R., Peter A., Gary S. et al.: ISPAD Clinical Practice Consensus Guidelines 2009 Compendium Exercise in children and adolescents with diabetes. Pediatr. Diabetes, 2009:10, 154-168.

21- McMahon S.K., Ferreira L.D., Ratnam N. et al.: Glucose requirements to maintain euglycemia after moderate-intensity afternoon exercise in adolescents with type 1 diabetes are increased in a biphasic manner. J. Clin. Endocrinol. Metab., 2007 Mar:92(3), 963-968.

22- Juvenile Diabetes Research Foundation Continuous Glucose Monitoring Study Group. Prolonged nocturnal hypoglycaemia is common during 12 months of continuous glucose monitoring in children and adults with type 1 diabetes. Diabetes Care, 2010 May:33(5), 1004-1008.

23- Marliss E.B., Vranic M.: Intense exercise has unique effects on both insulin release and its roles in glucoregulation: implications for diabetes. Diabetes, 2002 Feb:51 Supply 1, S271-83.

24- Mitchell T.H., Abraham G., Schiffrin A. et al.: Hyperglycaemia after intense exercise in IDDM subjects during continuous subcutaneous insulin infusion. Diabetes Care, 1988 Apr:11(4), 311- 317.

Appendix: A questionnaire on diabetes in children and adolescents in schools.

A questionnaire on diabetes in children and adolescents in schools				
• **Patient information. (Put ✓ on your answer)**				
1	Gender	Male [14]	Female[21]	
2	Age	5-10 [6]	11-14 [13]	15-18 [16]
3	Type of diabetes	Type 1 [28]	Type 2 [7]	
4	How the disease was discovered	Coincidence [10]	Periodic detection [4]	Onset of symptoms [21]
5	The causes of disease	Heredity [7]	Coincidence [26]	
6	How active you are in your studies	Weak [NONE]	Medium [20]	High [15]
7	Physical activity	Weak [3]	Medium [19]	High [14]
8	Effect range of diabetes on you	Affected [19]	Unaffected [16]	
9	Measuring blood sugar level	By himself [17]	With parental assistance [26]	
10	How concern the Health office at school	Medium [12]	High [1]	Not found [22]

• Your information about diabetes and how to deal with it. (Put ✓ on your answer)

		Yes	No
1	Do you have information about diabetes?	23	12
2	Does a child have diabetes?	15	20
3	Do you regularly visit a doctor?	12	23

4	Is the treatment of the disease by injecting insulin?	35	NONE
5	Do you get upset by the injection?	20	15
6	Do you receive grain (tablet) therapy?	NONE	35
7	Do you suffer from complications of diabetes?	25	10
8	Do you have information about diet for diabetes?	28	8
9	If yes 8 , Have you accepted the diet?	14	14
10	If yes 9 , Did you feel better after dieting?	18	10
11	Do you practice sport	33	2
12	Do you hide your illness from your peers at school?	17	18

• Factors that may cause diabetes. (Put ✓ on your answer)

		Agree	Not agree	I do not Know
1	Psychological and emotional tensions	18	4	13
2	Feeding on sugary foods	8	25	2
3	Genetics.	25	7	3
4	Exposure to certain chemicals	10	7	18
5	Viral disease.	10	7	18
6	Taking in some medical drugs.	10	7	18
7	Obesity.	28	5	2
8	Idle and lack of exercise.	19	3	13
9	Lack of health awareness of diabetes.	29	4	2