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**Forewarnings of Diabetes: Weapons  
against this deadly disease****Manju Dewan****Corresponding Author:**

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**Abstract:**

Type-2 diabetes arrives slowly and silently. Initially Diabetes has a few symptoms, which are often ignored. Identifying the early symptoms of type-2 diabetes can prevent its long term complications. Type-2 diabetes in children generally develops gradually. It is a preventable disease if diagnosed early. Sometimes the symptoms are obvious, and sometimes they are not. Early detection and knowledge of the warning signs is the greatest weapon against the disease. Most of the children in this study are symptomless but having impaired glucose levels and diabetes. Parents and caregivers must be vigilant regarding the children's health, as often children do not know how to express their symptoms. In diabetic children, 60.87% experienced increased thirst but 39.13% do not show polydipsia. 95.65% do not experience polyuria. Most of the children did not experience polyphagia, tiredness, delayed healing of injury, numbness, weakness, loss of weight, lack of interest and concentration, blurred vision, vomiting and stomach pain. Early detection and treatment of diabetes can decrease the risk of developing the complications of diabetes. With proper diet and exercise, diabetes can be kept under control and the person can continue to live a normal life.

**Keywords:** Diabetes, Symptoms, warning signs, complications

**INTRODUCTION**

This "silent" nature of type-2 diabetes among the children points to the importance of screening Indian populations. Identifying the early symptoms of type 2 diabetes can prevent the long-term complications of diabetes. Type-2 diabetes in children generally develops gradually. Some children were not experiencing symptoms or might not realize that the issues they had been experiencing signal that their body no longer functions normally. There are more signs and symptoms of Type -2 diabetes in children. Despite consuming more calories, some diabetic children begin to lose weight, because without energy sugar supplies,

the muscle tissues and fat stores begin to shrink. Sometimes type-2 diabetes can develop without any warnings signs. In fact, about a one third of all people who have type-2 diabetes don't know they have it. It is important to know risks for diabetes and to determine common warnings signs of diabetes that include: Increased thirst, Increased hunger, Dry mouth, frequent urination or urine infections, unexplained weight loss, fatigue, blurred vision, headaches etc.

## MATERIALS AND METHODS

A random sampling procedure was used to draw sample from Chandigarh and its surrounding areas. 2048 children had undergone questionnaire and dietary survey and health examination. Out of these, 1017 were from urban population and 1031 from rural population. Children and adolescent aged 10-19 years were selected randomly for questioning regarding the different aspects of epidemiology and their health examination was done. The permission from parents of the children, undergoing examination and questionnaire survey was also taken on the self designed consent form. The Centers for Disease Control and Prevention (CDC) suggests two levels of concern for children based on the BMI-for-age charts.

At the 85th percentile and above, children are "at risk for overweight" and, at the 95th percentile or above, they are "overweight". The cutoff for underweight of less than the 5th percentile is based on recommendations by the World Health Organization Expert Committee on Physical Status 1996.

### Fasting Blood Sugar

Fasting blood sugar test was performed. The diagnostic criteria for diabetes mellitus have been modified from those previously recommended by WHO (1985). The revised criteria for the diagnosis of diabetes is used which is as follows:

Categories of Fasting plasma glucose (FPG) values are as follows:

- FPG <110 mg/dl (6.1 mmol/l) = **normal fasting glucose**;
- FPG 110 (6.1 mmol/l) and <126 mg/dl (7.0 mmol/l) = **IFG (Impaired Fasting Glucose)/Prediabetes**.
- FPG  $\geq$ 126 mg/dl (7.0 mmol/l) = **diabetes**

*(Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus (2003))*

## RESULTS AND DISCUSSION

Most of the children in this study are symptomless but having impaired glucose levels and diabetes. Parents and caregivers must be vigilant regarding the children's health, as often children do not know how to express their symptoms. In diabetic children, 60.87% experienced increased thirst but 39.13% do not show polydipsia. 95.65% do not experience polyuria. Most of the children did not experience the polyphagia, tiredness, delayed healing of injury, numbness, weakness, loss of weight, lack of interest and concentration, blurred vision, vomiting and stomach pain (Table 1).

**Table 1:** Prevalence of Symptoms or Warning signs of diabetes in total population

Increased thirst				
Group/Sub Group	Yes		No	
FBG Categories	N	%	N	%
1. <110	807	40.49	1186	59.51
2. 110-126	18	56.25	14	43.75
3. >=126	14	60.87	9	39.13
Chi^2=7.04*(df:2) C=0.06				
Frequent urination				
Group/Sub Group	Yes		No	
FBG Categories	N	%	N	%
1. <110	197	9.88	1796	90.12
2. 110-126	1	3.12	31	96.88
3. >=126	1	4.35	22	95.65
Chi^2=2.40(df:2) C=0.03				
Increased hunger				
Group/Sub Group	Yes		No	
FBG Categories	N	%	N	%
1. <110	416	20.87	1577	79.13
2. 110-126	6	18.75	26	81.25
3. >=126	5	21.74	18	78.26
Chi^2=0.10(df:2) C=0.01				
Weakness				
Group/Sub Group	Yes		No	
FBG Categories	N	%	N	%
1. <110	413	20.72	1580	79.28
2. 110-126	6	18.75	26	81.25
3. >=126	3	13.04	20	86.96
Chi^2=0.89(df:2) C=0.02				
Numbness				
Group/Sub Group	Yes		No	
FBG Categories	N	%	N	%
1. <110	261	13.10	1732	86.90
2. 110-126	3	9.38	29	90.62
3. >=126	3	13.04	20	86.96
Chi^2=0.38(df:2) C=0.01;				
Loss of weight				
Group/Sub Group	Yes		No	
FBG Categories	N	%	N	%
1. <110	157	7.88	1836	92.12
2. 110-126	1	3.12	31	96.88
3. >=126	4	17.39	19	96.88

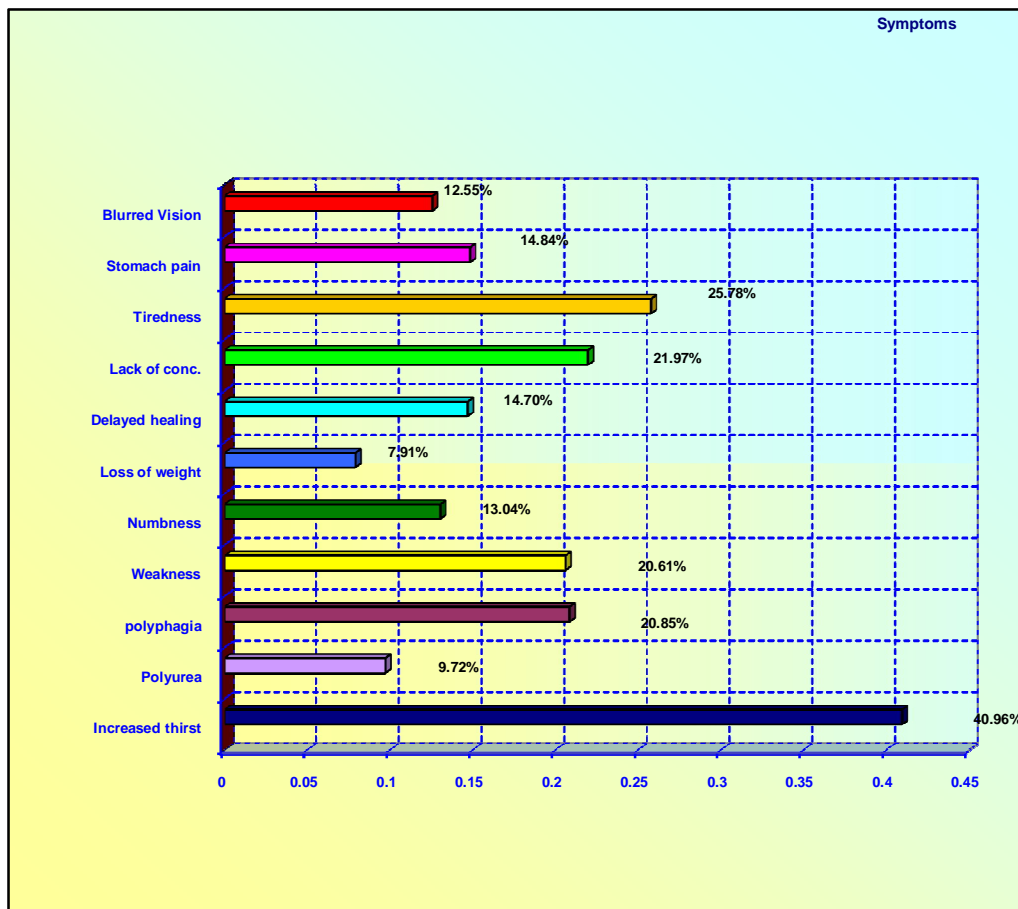
Chi <sup>2</sup> =3.85(df:2) C=0.04				
Delayed healing of injury				
Group/Sub Group	Yes		No	
FBG Categories	N	%	N	%
1. <110	290	14.55	1703	85.45
2. 110-126	6	18.75	26	81.25
3. >=126	5	21.74	18	78.26
Chi <sup>2</sup> =1.36(df:2) C=0.00;				
Lack of interest and concentration				
Group/Sub Group	Yes		No	
FBG Categories	N	%	N	%
1. <110	438	21.98	1555	78.02
2. 110-126	7	21.88	25	78.12
3. >=126	5	21.74	18	78.26
Chi <sup>2</sup> =0.00(df:2) C=0.03				
Tiredness				
Group/Sub Group	Yes		No	
FBG Categories	N	%	N	%
1. <110	515	25.84	1478	74.16
2. 110-126	6	18.75	26	81.25
3. >=126	7	30.43	16	69.57
Chi <sup>2</sup> =1.09(df:2) C=0.02				
Vomiting and stomach pain				
Group/Sub Group	Yes		No	
FBG Categories	N	%	N	%
1. <110	301	15.10	1692	84.90
2. 110-126	1	3.12	31	96.88
3. >=126	2	8.70	21	91.30
Chi <sup>2</sup> =4.27(df:2) C=0.05				
Blurred vision				
Group/Sub Group	Yes		No	
FBG Categories	N	%	N	%
1. <110	247	12.39	1746	1746
2. 110-126	6	18.75	26	81.25
3. >=126	4	17.39	19	82.61
Chi <sup>2</sup> =1.66(df:2) C=0.03				

Children had obvious symptoms like a noticeable increase in thirst and subsequent frequent urination. As excess sugar builds in the system, fluid leaches from the tissues, resulting in a feeling of dehydration that brings on pangs of thirst. Hunger, too, may increase in intensity and frequency as the sugar can no longer move into the cells to produce energy, and muscles and organs become energy depleted. The brain sends and receives signals to consume more and more food in order to try and restore the balance. As the condition progresses, a child's

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vision may begin to blur as fluid retreats from the eyes' lenses, making it difficult for the child to focus properly. Child's scrapes, bruises or sores take longer than normal to heal, or that he / she seems to have frequent infections. Glucose rich blood is good breeding medium for pus forming microorganisms. Moreover, diabetes also affects small blood vessels (microangiopathy) and nerves (neuropathy) leading to a decrease in the blood supply of the skin and derangement of skin infections. Thus wound on a diabetic's body fails to heal in time (Gala, 1996).

Children can develop a condition called Acanthosis nigricans, or patches of dark velvety skin especially in the folds and creases of the body, like the armpit and neck area. This also signals insulin resistance.



The evidence that micro vascular complications of diabetes are strongly associated with previous hyperglycemia raises interest in earlier diagnosis during the asymptomatic period. Diabetes remains undiagnosed and symptom less in many subjects. When it affects various organs or systems of the body, then it gives rise to various symptoms. These symptoms point towards the possibility of diabetes.

Most of the European Caucasian children and adolescents with type -2 diabetes and one-third of the American children were asymptotically at diagnosis (Reinehr & Wabitsch, 2005). Type -2 diabetes is characterized by the absence of early symptoms of the disease.

Ahuja (1987), Ahuja (1996), Gala (1996), Krentz (1997) also mentioned the symptoms of diabetes. But exact number had not been mentioned. Study regarding the early symptoms of diabetes children and adolescent was lacking in this area. In 2014 the global prevalence of

diabetes was estimated to be 9% among adults aged 18+ years (WHO, 2012) in 2012, an estimated 1.5 million deaths were directly caused by diabetes. More than 80% of diabetes deaths occur in low- and middle-income countries (WHO, 2014) WHO projects that diabetes will be the 7th leading cause of death in 2030 (Mathers and Loncar, 2006) Healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco can prevent or delay the onset of type 2 diabetes (WHO, 2011, 2012). According to the Centers for Disease Control and Prevention, more than a quarter about 8 million people remain undiagnosed. The warning signs can be so mild that it cannot be noticed. Recognizing the warning signs can help you get diagnosed and begin treatment. Obesity is a major risk factor for the disease. While most common in adults, it is increasingly being diagnosed in children, in part due to the childhood obesity epidemic.

Long-term uncontrolled blood sugar levels can lead to complications like nerve damage, kidney damage, hearing impairment, skin problems, eye damage, and heart disease. Some of these complications, like poor circulation, can eventually lead to amputations of the feet or legs. Preventing these complications requires a diagnosis and consistent treatment. Identifying the early symptoms of type- 2 diabetes can make this possible.

## **CONCLUSION**

Diabetes is a serious disease. It creeps into the body very silently. With the early diagnosis of its symptoms, damaging effects of diabetes can be decreased and delayed. Complications can be delayed with early diagnosis of diabetes. Many people have it for a few years before they are diagnosed the complications like kidney failure, stroke, heart disease or eye problems. If diabetes is not controlled, it could become devastating or even serious.

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