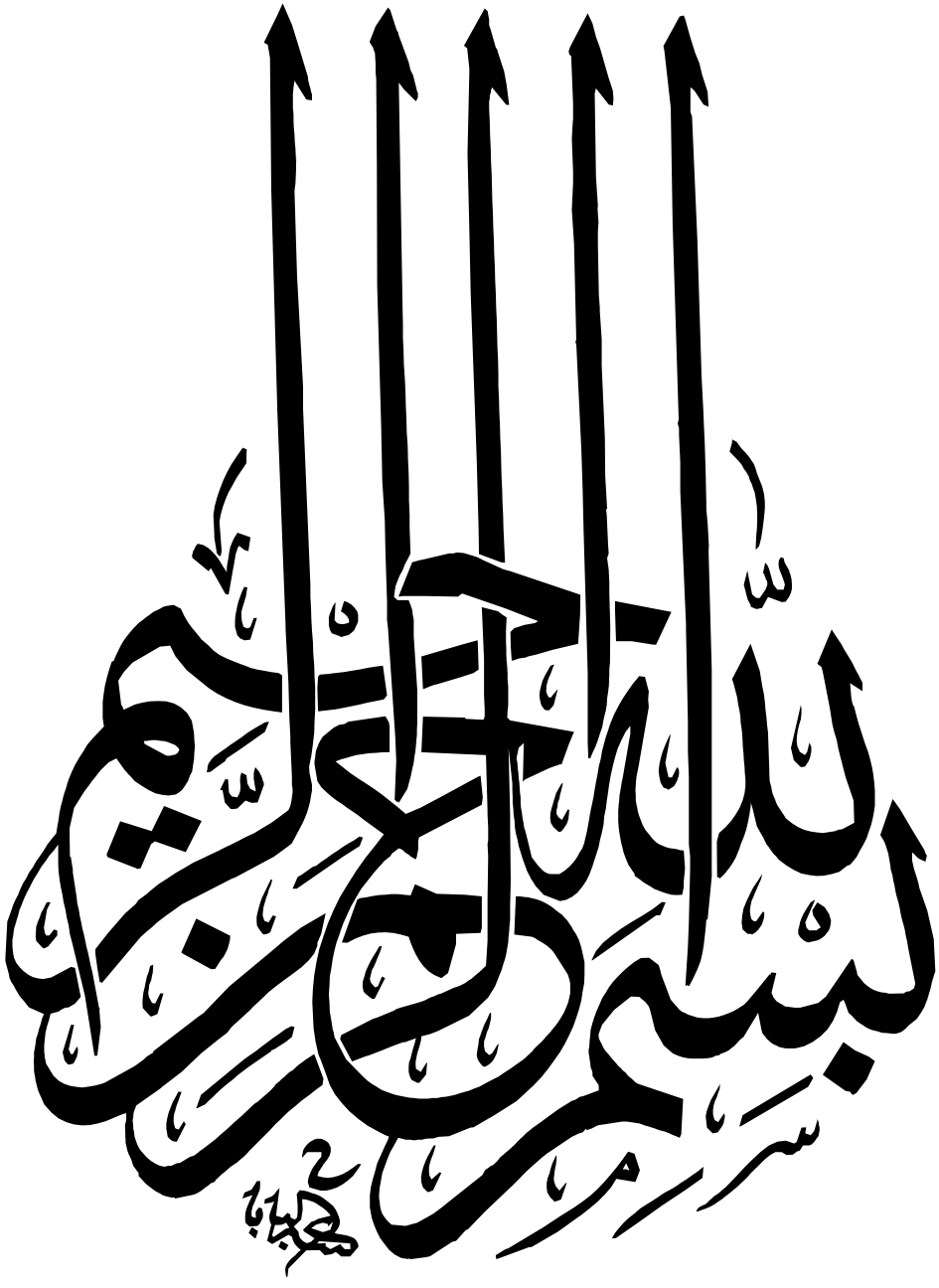
بسم الله الرحمن الرحيم

A study of the etiology, risk factors, clinical features and pitfalls in management of newly diagnosed diabetic children and adolescents

Thesis

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Abstract

Introduction: Diabetes mellitus is a group of metabolic disorders characterized by hyperglycemia and accompanied by long term damage, dysfunction and failure of various organs.

Aim of the study: to identify the etiology, risk factors and the most common clinical features of newly diagnosed diabetes in children and adolescents. And identification of the factors related to delayed diagnosis or mismanagement in these children.

Methods: Ninety nine children (52 males and 47 females) , aged from few days to 13 years, diagnosed with newly diagnosed diabetes, referred and managed at DEMPU in Children's Hospital, Cairo University.

Results: Classic symptoms (polyuria, polydipsia and weight loss) were the most common symptoms (95.9% &90.7%) preceding the diagnosis; and diabetic ketoacidosis was present in 51.5%. Delayed and missed diagnosis was recorded in 49.5 %, with no significant relation to age, district of accommodation or family history of diabetes. Cow's milk feeding was more frequent, being recorded in 79.3% vs. 20.7% with exclusive breast feeding, and positive family history of diabetes was recorded in 77.3%. Severity at presentation showed no significant relation to age, type of feeding, family history of diabetes or C-peptide level.

Conclusion: the classic triad of diabetes is the commonest presenting symptom of diabetes in children. Misdiagnosis and mismanagement are common and accounts for more severe presentation among newly diagnosed diabetic children, with infants below 2 years of age being the most vulnerable group to such problem. Positive family history of diabetes is high and positive FH of type 2 diabetes mellitus is more frequent than type 1or both. Early introduction of cow's milk appears to be a risk factor for the development of type 1 diabetes mellitus (T1DM).

Keywords: Diabetes, Children, clinical picture, misdiagnosis.

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List of Abbreviations

AAP	American Academy Of Pediatrics
ADA	American Diabetes Association
AN	Acanthosis Nigricans
BCG	Bacillus Calmette-Guerin
BMI	Body Mass Index
CDC	Centers For Disease Control And Prevention
CSII	Continuous Subcutaneous Insulin Infusion
CVB 1-6	Group B Coxsakie Viruses
DAISY	Diabetes Autoimmunity Study In The Young
DEMPU	Diabetic, Endocrine And Metabolic Pediatric Unit
DCCT	Diabetes Control And Complications Trial
DKA	Diabetic Ketoacidosis
DM	Diabetes Mellitus
DPP-IV	Dipeptidyl Peptidase-IV
DPT	Diabetes Prevention Trial
FDA	US Food And Drug Administration
FPG	Fasting Plasma Glucose
GAD_{65}	Glutamic Acid Decarboxylase
GADAs	Glutamic Acid Decarboxylase Antibodies
GDM	Gestational Diabetes Mellitus
GLP-1	Glucagon-Like Peptide 1
HbA_1C	Glycosylated Hemoglobin
HEV-B	Human Enterovirus B

HLA	Human Leukocyte Antigen
HNF	Hepatocyte Nuclear Factor
IAAs	Anti-Insulin Autoantibodies
IA2/ICA512	Anti-Tyrosine-Phosphatase Antibodies
ICAs	Islet Cell Antibodies
IDDM	Insulin Dependant Diabetes Mellitus
IFG	Impaired Fasting Glucose
IGT	Impaired Glucose Tolerance
IPF	Insulin Promoter Factor
IPEX syndrome	Immunodysregulation Polyendocrinopathy Enteropathy X-Linked Syndrome
IR	Insulin Resistance
IRR 84/510	International Reference Reagent
ISPAD	International Society For Pediatric And Adolescent Diabetes
IZS	Insulin Zinc Suspension
LADA	Latent Autoimmune Diabetes Of The Adult
LADC	Latent Autoimmune Diabetes In Children
LDL-C	Low Density Lipoprotein - C
MHC	Major Complex Of Histocompatibilty
MODY	Maturity Onset Diabetes Of The Young
MRDM	Malnutrition-Related Diabetes Mellitus
NDM	Neonatal Diabetes Mellitus
NPH	Neutral Protamine Hagedorn Insulin
NIDDM	Non-Insulin Dependant Diabetes Mellitus
NRC	National Research Centre
OGTT	Oral Glucose Tolerance Test
OR	Odds Ratio

PCOS	Polycystic Ovarian Syndrome
PNDM	Permanent Neonatal Diabetes Mellitus
PTPN 22:	Protein Tyrosine Phosphatase, Nonreceptor-Type
SAS	Statistical Analysis Systems
SES	Socioeconomic Status
SDS	Standard Deviation Score
SGA	Small For Gestational Age
SPIDDM	Slowly Progressing Insulin Dependent Diabetes
T1BDM	Type 1 B Diabetes Mellitus
TCF7L2	Transcription Factor 7-Like 2
T1DM	Type 1 Diabetes Mellitus
T2DM	Type 2 Diabetes Mellitus
Th_1, Th_2	T Helper 1, 2

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Introduction

Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. The chronic hyperglycemia of diabetes is associated with long term damage, dysfunction, and failure of various organs especially the eyes, kidneys, nerves, heart and blood vessels **(*Craig et al., 2009).***

The vast majority of cases of diabetes fall into 2 broad etiopathogenetic categories: type 1 DM (T1DM) caused by absolute deficiency of insulin, and type 2 DM (T2DM) which is characterized by the presence of insulin resistance with inadequate compensatory increase in insulin secretion. Other uncommon types of diabetes include those caused by infections, drugs, endocrinopathies, pancreatic destruction and genetic defects ***(ADA, 2010).***

T1DM is the most commonly diagnosed type in children and adolescents and usually presents with symptomatic hyperglycemia and imparts the immediate need for exogenous insulin replacement ***(Haller, 2005)***

T2DM is the most common in adults and its prevalence in children is increasing. Pediatric patients with T2DM are likely to be obese or overweight and present with glycosuria without ketonuria, absent or mild polyuria and polydipsia and little or no weight loss ***(Reinehr, 2005).***

The presentation of T1DM is either as classic new onset (most common), silent diabetes or diabetic ketoacidosis – DKA (20-40%) ***(Haller, 2005)***

Classic new onset T1DM patients present with polyuria, polydipsia, polyphagia, weight loss and lethargy; while those with silent T1DM are typically diagnosed by families or physicians with high index of suspicion. Children who present with DKA present with dehydration, vomiting, altered mental status and rapid deep respiration (Kussmaul's breathing) **(*Craig et al., 2009).***

Because DKA is a potentially preventable acute complication of diabetes mellitus and a predominant cause of mortality in these children, early recognition and prompt treatment should substantially reduce childhood mortality in children with type 1 DM ***(Scibilia et al., 1986)***

Increased public awareness of early symptoms of diabetes is needed to reduce the frequency and severity of ketoacidosis. In addition, greater medical alertness to the possibility of T1DM in a young child should be stressed ***(Mallare et al., 2003)***