



Study of Markers of Oxidative Stress and Reducing Substance during the Course of Diabetic Ketoacidosis in Diabetic Children and Adolescents

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سببنا انك لا تعلم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

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List of Abbreviations

Abb.	Full term
<i>CAT</i>	<i>Catalase</i>
<i>Cu</i>	<i>Copper</i>
<i>DAG</i>	<i>Diacylglycerol</i>
<i>DKA</i>	<i>Diabetic ketoacidosis</i>
<i>DM</i>	<i>Diabetes mellitus</i>
<i>G6PD deficiency</i> ...	<i>Glucose 6 phosphate dehydrogenase deficiency</i>
<i>GPX</i>	<i>Glutathione peroxidase</i>
<i>GSH</i>	<i>Reduced glutathione</i>
<i>HbA1c</i>	<i>Glycated hemoglobin</i>
<i>LDL</i>	<i>Low density lipoproteins</i>
<i>MDA</i>	<i>Malondialdehyde</i>
<i>NADPH</i>	<i>Nicotinamide adenine dinucleotide phosphate</i>
<i>ROS</i>	<i>Reactive oxygen species</i>
<i>SMBG</i>	<i>Self-monitored blood glucose</i>
<i>SOD</i>	<i>Superoxide dismutase</i>
<i>Zn</i>	<i>Zinc</i>

INTRODUCTION

Diabetes mellitus is one of the most common metabolic disorders among the pediatric age group (*Guariguata et al., 2014*). It can be described as a disorder where there are multiple factors that play a role in its pathogenesis including genetic predisposition as well as environmental factors (*Maahs et al., 2010*). Furthermore, these environmental factors include: infection, breastfeeding, psychological stress and birth weight (*Virtanem, 2016*). This genetic predisposition in addition to the mentioned factors trigger the autoimmune response against the pancreatic beta cells which eventually lead to their destruction (*Guariguata et al., 2014*).

Diabetic ketoacidosis is a very common, and a potentially life threatening complication of diabetes mellitus type 1. patients usually present with nausea, abdominal pain, respiratory distress, dehydration, and disturbed conscious level (*NICE guidelines, 2015*). Not only that, but unfortunately it could be the first presentation in newly diagnosed patients, and is actually the number one indication for hospitalization of children with diabetes mellitus type 1 (*Cemil Kaya, 2015*).

The islets cells of pancreas are highly susceptible to oxidative stress either endogenous, or exogenous. This eventually lead to their dysfunction and death. For example, throughout the respiratory chain in the inner membrane of the most important source of reactive oxygen species which is the