The Effect of Lactoferrin versus Iron Supplement in Treating Iron Deficiency Anemia and Helping weight Loss in Obese School Age Children

Thesis

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List of Abbreviations

Abb.	Full term
BMI	Body mass index
CAD	Coronary artery disease
CNS	Central nervous system
GM-CSF	Granulocyte monocyte colony stimulating factor
Hb	Hemoglobin
HDL	High-density lipoprotein
IDA	Iron deficiency anemia
IL	Interleukin
LF	Lactoferrin
MAOIs	Monoamine oxidase inhibitors
MCH	Mean corpuscular hemoglobin
MCV	Mean corpuscular Volume
NAD	Nicotinamide Adenine Dinucleotide
NAFLD	Nonalcoholic fatty liver disease
NHANES	National Health and Nutrition Examination Survey
PCOS	Polycystic ovary syndrome
TCAs	Tricyclic antidepressants
TIBC	Total Iron Binding Capacity
UIBC	Unsaturated Iron Binding Capacity
US	United States
WHO	World Health Organization

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Introduction

Overweight and obese children are at risk for immediate and long-term health consequences, including cardiovascular and metabolic risks as iron deficiency anemia, and additional comorbidities, including obstructive sleep apneas, nonalcoholic fatty liver diseases, and musculoskeletal disorders ***(Ebbeling et al., 2002)*.**

Low iron status in overweight and obese individuals might also be caused by greater iron requirements because of poor dietary iron intake, dilution because of increased blood volume, and reduced iron absorption because of adiposity-related inflammation or a combination of the three scenarios ***(Eckhardt et al., 2008)*.**

Lactoferrin (LF) is a non heme iron-binding glycoprotein strongly expressed in human and bovine milk and it plays many functions during infancy such as iron homeostasis and defense against microorganisms. In humans, LF is mainly expressed in mucosal epithelial and immune cells. LF is the second most abundant protein in human milk. It is mainly present in body fluids since it is

found in most mucosal secretions such as saliva, tears, bile, pancreatic juice, intestinal mucus, seminal fluid, and genital secretions ***(Lambert, 2012).***

The level of LF concentration in the body is inversely associated with BMI, the (waist / hip) ratio and the fasting TAG and glucose concentrations, and positively with insulin sensitivity. Also, preservation of LF leads to decreased free lipopolysaccharide concentration and maintenance of an adequate lipid profile ***(Moreno et al., 2010).***

Aim of the Work

1- Determining the prevalence of iron deficiency anemia in obese school age children.

2- Studying the effect of lactoferrin versus iron supplementation on treatment of iron deficiency anemia in obese school age children.

3- Studying the effect of lactoferrin versus iron supplementation on weight loss in obese school age children.

Chapter (1):

Obesity in Children

Introduction

Childhood obesity is one of the most serious public health challenges of the 21st century. The problem is global and is steadily affecting many low- and middle-income countries, particularly in urban settings. The prevalence has increased recently at an alarming rate ***(WHO, 2019).***

The rise in the rate of obesity in school-aged children, adolescents, and young adults in the last 30 years is a clear healthcare crisis that needs to be addressed ***(Karp & Gesell, 2015).***

Obesity in children is a complex disorder. Its prevalence has increased significantly in recent years that many consider it as a major health concern of the developed world. The National Health and Nutrition Examination Survey (NHANES) indicates that the prevalence of obesity is increasing in all pediatric age groups, in both sexes, and in various ethnic and racial groups ***(Skinner et al., 2015).***

Definitions:

Overweight and obesity are defined as "abnormal or excessive fat accumulation that presents a risk to health. It is difficult to develop one simple index for the measurement of overweight and obesity in children and adolescents because their bodies undergo a number of physiological changes as they grow ***(WHO, 2019).***

Epidemiology:

i. International statistics

International data regarding childhood obesity varies, and accuracy may be less than optimal; however, the highest rates for children at risk for obesity were found in Malta (25.4%) and the United States (25.1%). Lithuania (5.1%) and Latvia (5.9%) had the lowest rates ***(Ogden et al., 2015).***

ii. United States statistics

The prevalence of obesity in children and adolescents in 2009-2010 was noted to be 16.9% which is comparable to the prevalence rates reported in 2007-2008 ***(Peirson et al., 2015).***