

**Occult Blood in Stool in Exclusively Formula Fed
Infants Versus Exclusively Breast Fed Infants in the First
6 months Of Life.**

Thesis

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Dedication

*To my family who
support me to end this
work*

*To my beloved husband
for his understanding
and support*

Heba

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

ذَكَ عَنْ الرُّوحِ ^{صَلَّى} قُلِ الرُّوحُ مِنْ أَمْرِ
مَا أُوتِيْتُمْ مِّنَ الْعِلْمِ إِلَّا قَلِيلاً "

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ABBREVIATIONS

AA	Arachidonic acid
AAF	Amino acid formula
AAP	American Academy of Pediatrics
AAFP	American Academy of family physician
ADP	Adenosine diphosphate
AGA	Appropriate for gestational age
ALL	Acute lymphoblastic leukemia
AML	Acute myeloid leukemia
AMP	Adenosine monophosphate
AOM	Acute otitis media
BSSL	Bile salt-stimulated lipase
C3	Complement 3
C4	Complement 4
Ca ²⁺	Calcium
cAMP	Cyclic Adenosine monophosphate
CBC	Complete Blood Count
CHr	Reticulocyte hemoglobin concentration
CDP	Cytidinediphosphate
cGMP	Cyclic Guanosine monophosphate
CM	Cow milk
CMA	Cow milk allergy
CMI	Cow milk intolerance
CMP	Cytidine monophosphate
CMPA	Cow milk protein allergy
CMPSE	Cow milk protein sensitive enteropathy
CNS	Central nervous system
CRP	C -reactive protein

CVS	Cyclic vomiting syndrome
DBPCFCs	Double blind placebo controlled food challenges
DHA	Docosahexaenoic acid
DNA	Deoxyribonucleic acid
E.coli	Escherichiacoli
EGF	Epidermal growth factor
eHFs	Extensively hydrolyzed formula
ELISA	Enzyme-Linked Immunosorbent Assay
EPO	Erythropoietin
FAs	Fatty acids
Fe ²⁺	Iron
FEP	Free erythrocyte protoporohyrin
FFA	Free fatty acid
FMH	Fetal maternal hemorrhage
FOB	Fecal occult blood
FPIES	Food protein induced enterocolitis syndrome
GDP	Guanosinediphosphate
GER	Gastroesophageal reflux
GIFN	Gamma interferon
GIT	Gastrointestinal tract
GM1	Ganglioside M1
GMP	Guanosine monophosphate
G6PD	Glucose-6-phosphate dehydrogenase
GRH	Growth hormone releasing hormone
Hb	Hemoglobin
HCT	Hematocrit
Hib	Haemophilusinfluenzae type B
HIV	Human Immunodefeciency virus

HSV-1	Herpes simplex virus type 1
ID	Iron Defeciciency
IDA	Iron Defeciciency Anemia
IgA	Immunoglobulin A
IL	Interleukin
IDDM	Insulin- dependent diabetes mellitus
JRA	Juvenile raumatoid Arthritis
LBW	Low birth weight
LCPUFA	Long-chain polyunsaturated fatty acids
LRIs	Lower respiratory tract illness
MCSF	Macrophage colony-stimulating factor
MCV	Mean Corpuscular Volume
MG	Monoglycerides
MHC	Major histocompatibility complex
Mg ²⁺	Magnesium
NEC	Necrotizing enterocolitis
NPN	Non-protein nitrogen
PAF	Platelet activiating factor
PGs	Prostagalndins
PGE	Prostaglandin E
PL	Pyridoxal
PMNs	Polymorphonuclearleukocytes
PN	Pyridoxine
RAST	Radioallergosorbent test
RBCs	Red blood cells
RDW	Red blood cell distribution width
ROM	Recurrent otitis media
RSV	Respiratory syncytial virus
SIDS	Sudden infant death syndrome
SF	Serum ferritin

sIgA	Secretory Immunoglobulin
SPSS	Statistical Package for Studies.
T4	Thyroxine
TfR1	serum transferrin receptor1
TG	Triglycerides
TGF	Transforming growth factor
TIBC	Total iron binding capacity
TNF	Tumor necrosis factor
TRH	thyroid –releasing hormone
TS	Transferrin saturation
TSH	Thyroid stimulating hormone
TTS	Twin-twin transfusion syndrome
UIBC	Unsaturated iron binding capacity
VLBW	Very low birth weight
WHO	World Health Organization

Abstract

BACKGROUND: Since most of infant formulas are based on cow's milk to which allergy can occur, and considering the neurodevelopmental consequences of iron deficiency during infancy; we aimed in this study to verify the occurrence of occult intestinal blood loss in infants during the first 6 months of life in response to being fed Cow's milk based formula versus breast milk and we also studied iron status in those infants in order to assess prevalence of iron deficiency anemia and identify the candidate for Fe supplementation.

METHODS: Healthy full term infants from birth to 6 months who were either exclusively breast fed (n=50) or formula fed (n=50) were considered for enrollment. Hematologic and iron status was evaluated (complete blood count, serum iron, total iron binding capacity and serum transferrin) and occult blood in stool was requested for each infant.

RESULTS: we reported no significant differences in hematologic indices (Hemoglobin, Hematocrit and MCV) between the breast fed group and formula fed group. Formula fed infants had higher levels of total iron binding capacity rather than breast fed infants. We found that 4/50 formula fed infants were positive for occult blood in stool; while only 1/50 breast fed infant was positive occult blood in stool. The prevalence of iron deficiency anemia was higher in formula fed group (14%) rather than in breast fed group (8%). The Prevalence of anemia among infants born to anemic mothers was significantly higher (73%) rather than those born to non-anemic mothers (27%).

CONCLUSION: Breast fed infants attained better iron status rather than formula fed infants. Higher prevalence of anemia among formula fed infants rather than in breast fed infants. Occult blood in stool is considered as an aggravating factor of iron deficiency anemia among formula fed infants. We reported a positive association between maternal anemia during pregnancy and iron deficiency anemia in the first 6 months of life.

Key words:

Breastfeeding - Cow milk based formula - Iron deficiency anemia -Maternal anemia - Occult blood in stool.