

RELATION BETWEEN MATERNAL
AND NEONATAL BLOOD LEAD
LEVELS

THESIS

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BY

GIHANE AHMED MOHAMED FARAG

M.B.,B.Ch.

UNDER SUPERVISION OF

2003201
PROF. DR. OMAR HELMY

PROFESSOR AND CHAIRMAN OF
PEDIATRIC DEPARTMENT

AIN SHAMS UNIVERSITY

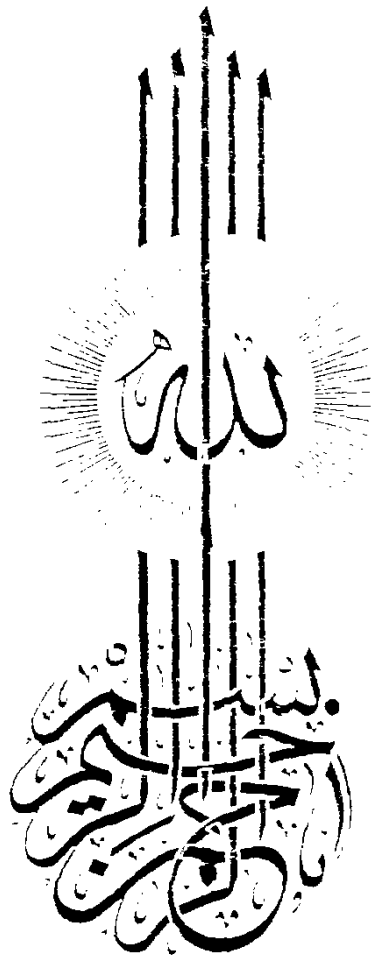
DR. ABDEL AZIZ MOHAMED KAMAL

LECTURER OF INDUSTRIAL MEDICINE

AIN SHAMS UNIVERSITY

FACULTY OF MEDICINE
AIN SHAMS UNIVERSITY

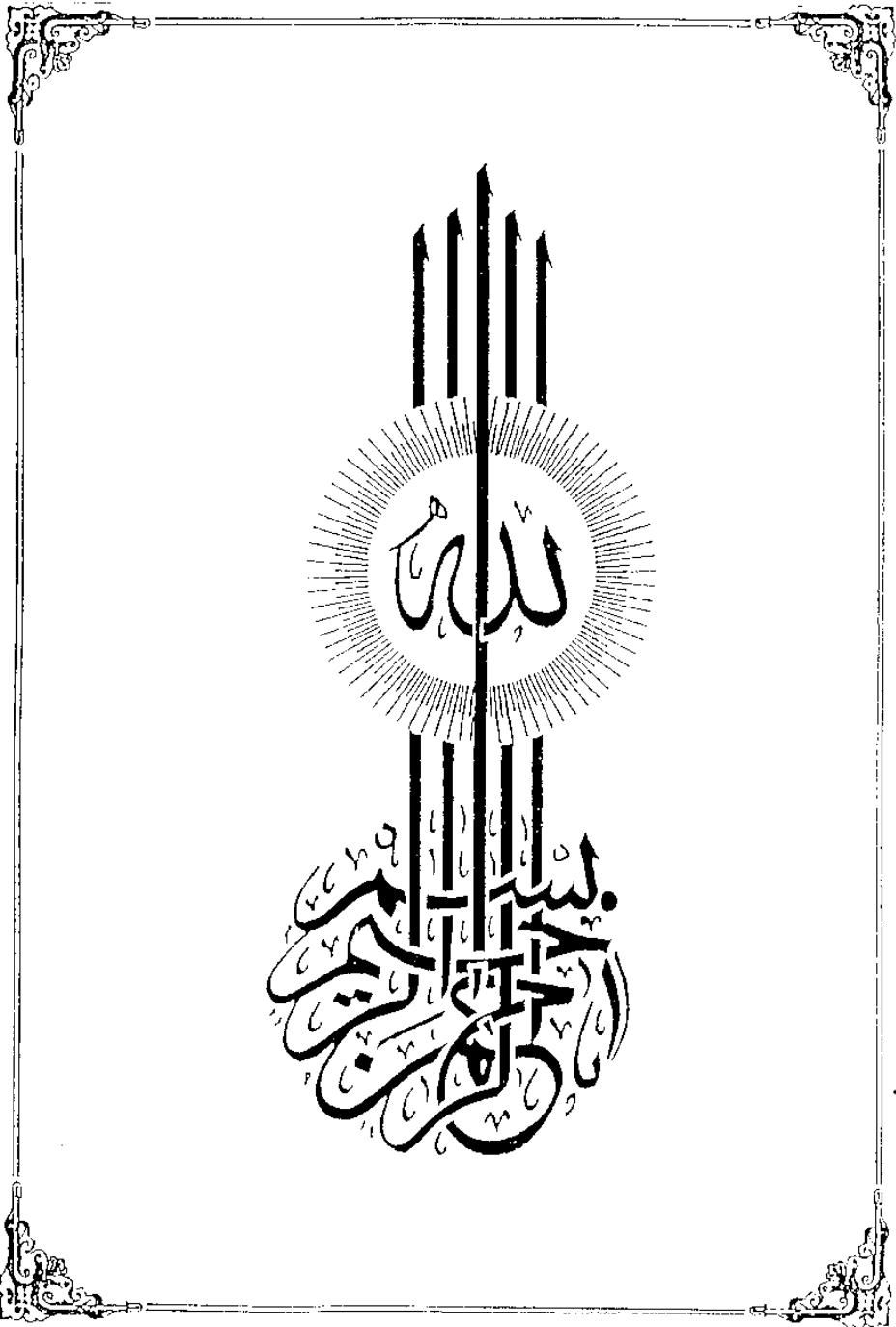
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”وقد رب زدني علما“

صلى الله العظيم

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ABBREVIATIONS

ALA	=	Aminolevulinic acid
ALAD	=	Aminolevulinic acid dehydratase
ATPase	=	Adenosine triphosphatase
°C	=	Degree Centigrade
CC	=	Cubic centimeter
CDC	=	Center for disease control
CM	=	Carboxymethyl
CNS	=	Central nervous system.
DPI	=	Daily permissible intake
EDTA	=	Ethylene - diamine tetra- acetic- acid
EP	=	Erythrocyte protoporphyrin
EPP	=	Erythrocytic protoporphyrin
FRT	=	Ferritin
g	=	gram
GM	=	Geometric mean
Hb	=	Hemoglobin
HbF	=	Fetal hemoglobin
HG	=	Heated graphite
HNO ₃	=	Nitric acid
I Q	=	Intelligent quotient
K ⁺	=	Potassium
Kg	=	Kilogram
m	=	meter
mm	=	millimeter
mg	=	milligram
ml	=	milliliter
n	=	number
Na ⁺	=	Sodium
NH ₄ H ₂ PO ₄	=	Ammonium dihydrogen Phosphate

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nm	=	manometer
P	=	Probability
Pb	=	lead
PbB	=	Blood lead
PBG	=	Porphobilinogen
PPm	=	Part Per million
r	=	Correlation
SD	=	Standard deviation
sec	=	Second
U	=	micron
Ug	=	microgram
μ l	=	microliter
USA	=	United States of America
$\bar{X}$	=	Mean
χ^2	=	Chi- Square
%	=	Percent

INTRODUCTION

I N T R O D U C T I O N

Although the intrafamilial transmission of infectious diseases has long been recognized, the induction of environmental diseases in household contacts is being increasingly documented and requires a higher index of suspicion. Unexpected evidence of lead induced abnormalities, such as elevated blood lead and / or erythrocyte protoporphyrin levels, should focus the examiner's attention on possible intrafamilial transmission, treatment and prevention. [Fischbein et al ,1980].

Lead plays a significant role in the development of technology. Lead compounds such as lead carbonate [white lead] and lead oxide [red lead] have been used as pigments for many years, and until recently lead compounds were the most commonly used paint pigments. Organic lead compounds, such as tetraethyl lead and tetramethyllead, were developed in the 1920, to serve as antiknock additives in gasoline. The use of lead containing paint and leaded gasoline has been responsible for a gradual accumulation of lead wastes in recent times, resulting in an overall increase of lead absorption .

Industry in the United States consumes approximately 1.3 million tons of lead each year and annually releases 600,000 tons of lead into the environment.

Also, Lead is of clinical significance because of its well described toxicity even at low concentration. It is still a major poison in pediatric medicine. [Boeckx, 1984].

At the level to which human beings are exposed in the workplace as well as in the general environment, lead has been shown to be a toxic element in most of its chemical forms, whether it is inhaled or ingested in water or food. [De Michele, 1984.]

Barltrop, [1983], noted that clinical poisoning is now almost exclusively a disease of childhood . The sources of lead in children can be divided into " environmental " affecting whole populations and " adventitious" affecting individuals or particular families . The main debate now, centers on the possible effects of low levels of lead absorption, and the sources of lead in the environment

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which contributes to the body burden of lead, especially in children. [Associated Octel Company Limited Journal ,1984].

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**REVIEW
OF
LITERATURE**

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SOURCES OF LEAD

EXPOSURE

The hazard of lead as a powerful poison has been recognized since early civilization.

Food , water, air contain small amount of lead. The amount ingested daily in food and beverages is about 100 ug Pb, in drinking water is about 50 ug Pb per liter, in air is about 1 ug/m^3 . This is associated with average blood level of 10-15 ug Pb without adverse effect on health.

The powdering of paint from the surfaces of old buildings, lead in automotive exhaust, house dust in old housings, children living near lead-processing smelters or children of workers who bring leaded dust into their homes on their work clothes , are other sources of lead exposure in children. Also, lead shot, leaded jewelry swallowed and retained in the stomach, juices stored in improperly lead - glazed earthenware, lead toys which

children may chew, lead nipple shields," soft " drinking water stored in lead lined cisterns, lead soldered vessels used in cooking, fumes from burning casings of storage batteries, habitual chewing on toothpaste tubes and on the painted surface of lead pencils, all are other common sources of lead exposure. Sniffing of leaded gasoline by older children and adolescents is a source of organic lead exposure and toxicity which is characterised by toxic encephalopathy. [Chisolm ,1983].

* * *

THE MAIN SOURCES OF LEAD ARE :

FOOD :

The major source of environmental lead intake in human is food. The four main sources of contamination of food are soil, industrial pollution, agricultural technology and food processing. [De Michele, 1984].

Plant take up lead mainly from leaves and relatively little from soil, to which lead is tightly bound in insoluble compounds. Plants growing on soil containing 1 ppm of lead have shown 20-25 ppm per gram in their ash. Along heavily traveled highways, fruits and vegetables nearest to the traffic showed the highest lead load. Levels up to 3000 ppm have been recorded. In an extensive survey of lead in food, Shroeder et al , found the highest lead level in lettuce [1.04 ppm], kale [1.26 ppm] , Swiss chard [0.75 ppm], puffed rice [7.49 ppm] , and lobster [2.5 ppm]. Several epidemics of lead poisoning occurred in the Middle Ages, often caused by ingestion of acidic beverages [fruit juices, cider , wine and rum] contained in lead glazed earthenware or contaminated with lead during