Relation Between Zinc Status and Labour Abnormalities

Thesis Submitted for Partial Fulfillment
of Master Degree in Obstetrics and Gynecology

By

Osama Abdel Fattah Sayed Ahmed Omran
M.B.,B.Ch.

Supervisors

Prof Dr. Mohamed Ikram Shoukry
Prof of Obstetrics & Gynecology
Faculty of Medicine
Ain Shams University

Dr. Maged M.R. Abou Seeda
Lecturer of Obstetrics & Gynecology
Faculty of Medicine
Ain Shams University

Dr. Mohamed Salah Gabal
Lecturer of Department of Community,
Environment & Occupational Medicine
Faculty of Medicine
Ain Shams University

Cairo

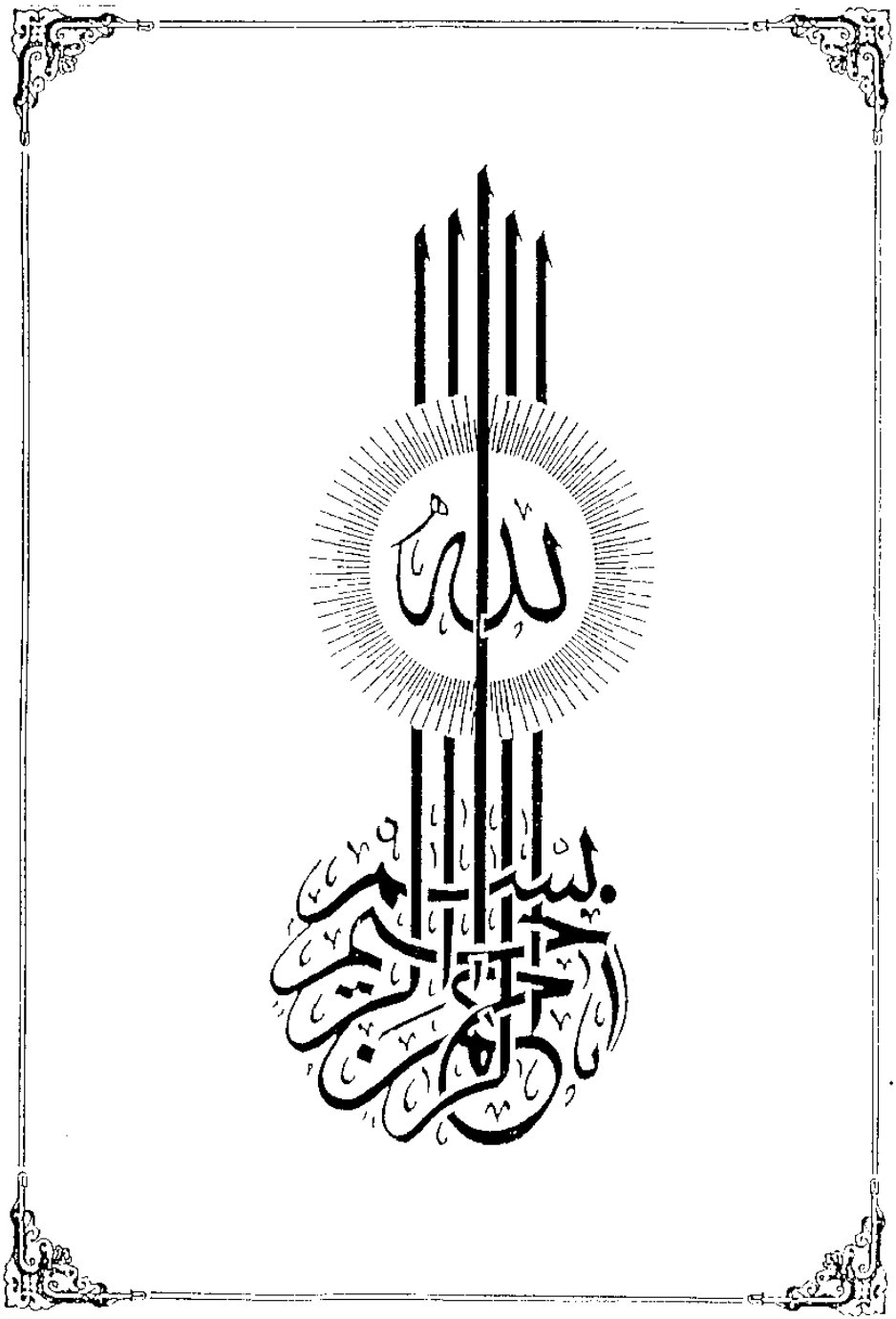
1991

بسم الله الرحمن الرحيم

" قالوا سبحانك لاعلم لنا
إلا ماعلمتنا
إنك أنت العليم الحكيم "

صدق الله العظيم

سورة البقرة ، آية ٣٢



Acknowledgement

First and foremost thanks are to Allah, The most Beneficent and Merciful.

I am really indebted to Prof. Dr. Ikram Shoukry, professor of Obstetrics and Gynecology, Ain Shams University, for accepting supervision, unlimited support and kind help throughout this work.

I would like also to express my sincere thanks and special gratitude to Dr. Maged Abdel [illegible], Lecturer of Obstetrics and Gynecology, Ain Shams University, for her patience and continuous guidance.

And to Dr. Salah [illegible] Assistant Prof of Community, Environmental and Occupational Medicine, Ain Shams University, my deep appreciation is extended for his valuable lab work and kind supervision.

Last but not least, I acknowledge my patients for their cooperation and all my senior and junior colleagues who helped me in achieving this work.

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Contents

Introduction & Aim of The Work

Introduction

The role of zinc as one of the trace elements in health and diseases is poorly understood. During pregnancy there is a phase of rapidly increasing nutritional requirements, so one would expect decrease in plasma zinc level. However, the causes of this decline and its possible adverse effects in labour pattern are not well established. Several authors have shown that abnormal zinc status are related to labour complications (Jameson, 1976). Reported recently that there are significant difference between plasma zinc level on one hand and duration of labour and final mode of delivery on the other hand (Durà Traavé et al., 1984).

Aim of The Work

The purpose of this study is to test the hypothesis that certain complications during labour would be related to lower zinc status which can be assessed by measuring plasma zinc level and alkaline phosphatase enzyme in the pregnant women.

Review of Literature

Trace Elements

Trace elements are those elements whose total concentration in a 70 kg human is less than 4 gms (Henkin, 1976). Our bodies depend on at least nine trace elements such as iron, zinc, copper, manganese, iodine, chromium, selenium, molybdenum, and cobalt for optional metabolic functions (Aggett, 1985).

Trace elements have been particularly aided by the recent development of novel techniques such as flameless atomic absorption spectrophotometry, gas liquid chromatography, x-ray fluorescence, and mass spectroscopy, which have allowed reliable measurement of several trace elements in different tissues.

Deficiency of an essential trace element results in a characteristic deficiency syndrome in a manner analogous to a specific vitamin or hormone deficiency.

The deficiency syndrome is associated with a specific structural, functional, biochemical and physiological abnormalities. These abnormalities, in turn, are prevented or

reversed after administration of the deficient element. Similarly, toxicity may result from excess of these essential elements. They perform functions indispensable to maitenance of life, growth and reproduction.

William and Thomas (1985) reported that improvement in analytical methods have expanded our understanding to the role of trace elements in human nutrition and disease. A summary of the data concerning body content, plasma concentration, appears in table (I), zinc status in table (II), zinc content of selceted foods table (III), and human requirement for zinc table (IV). Calcium, manganese, iron, zinc are the largest quantitaties. They are present in gram quantities. Copper, chromium, manganese, iodine however are found

Table (I): Trace elements (William and Thomas, 1985).

Element	Concentration				
	Body content	Whole blood /100 ml	Plasma or serum /100 ml	Average intake /day	Absorption
Calcium	1000 gm	9-10.5 mg	9-10.5 gm	0.2-1.5 gm	0.1-0.5 gm
Magnesium	25 gm	3.0 meq/l	1.8-2.5 meq/l	400 mg	100 mg
Iron	5 gm	43 mg (a)	70-180 µg	12-15 mg	0.6-1.5 mg
Zinc	2 gm	800 µg	120 µg (b)	10-15 mg	1 mg
Copper	100-150 mg	48 µg	109 µg	2.5-5 mg	0.6-1.6 mg
Iodine	10-20 mg	---	4-8 µg	50-1000 µg	50-1000 m
Manganese	12-20 mg	9.8 µg	1.4 µg	2-8 mg	
Molybdenum	10-20mg	15 µg	1.4 µg	100 µg	90 µg
Chromium	6 mg	15 µg	1-6 µg	50 µg	0.5 µg
Cobalt	1 mg	53 µg	2-3 µg	300 µg	30-60 µg%

(a) As iron in haemoglobin (0.345 % X 12.7 gm/100 ml)

(b) Serum 16 % higher than plasma.

Table (II): Zinc status.

Parameter	Normal values	References
Plasma Zn (μg/100 g)	102 ± 13	Sandstead et al. (1967)
Red blood cell Zn (μg/g)	10-14	Halsted et al. (1974
Salivary Zn (ng/ml)	51 ± 14	Henkin et al. (1975)
Hair Zn (μg/g)	142-210	Kevay (1970)
Urinary Zn (μg/24 h.)	300-700	Burch et al. (1975)

Table (III): Zinc contents of selected foods.

Food Item	Zinc mg/100 g (wet wt.
Meat products	
Boast beef	6.4
Beef patty (raw)	4.7
Chicken breast	1.1
Chicken thigh	2.8
Dairy products	
Milk	0.34
Cream (half and half)	0.40
Breads	
White	0.56
Rye	1.34
Whole Wheat	1.04
Vegetables and Fruits	
Peas	0.69
Potatoes	0.29
Green beans	0.21
Carrots	0.25
Tomatoes	0.20
Apricots	0.12
Peaches	0.07
Pears	0.08
Applesauce	0.08
Orange Juice	0.11
Apple Juice	0.07
Grapefruit Juice	0.10
Beverage	
Tea	0.02
Coffee	0.03
Decaf Coffee	0.04

Halsted, et al. (1974).

Table (IV): Human requirements for zinc (in mg/day except where otherwise stated).

Subjects	Daily intake	Daily retention	Estimated daily requirement
Infants			
	0.2 to 1.19 mg/kg	-0.85 to 0.08 mg/kg	
Preschool			
3 to 6 years	3.8 to 9.2	-2.7 to 3.39	0.300-0.307 mg/kg
School children	4.6 to 9.2	0.8 to 3.8	6.2
	13.85 to 18	4.92 ± 2.94	
Adolscents			
Adults			
Men & women	4.9 to 6.1	-0.8 to 0.0	

Halsted, et al. (1974).