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**EFFECT OF LACTATION ON MATERNAL AND INFANT
CALCIUM AND PHOSPHORUS STATUS**

Thesis

**Submitted for Partial Fulfilment for the
Master Degree in Pediatrics**

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To my husband & son



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LIST OF ABBREVIATIONS

Ca	calcium
PTH	parathyroid hormone
H_2PO_4	Sulphuric acid
CO_2	carbon dioxide
HCO_3	bicarbonate
H^+	hydrogen ion.
ATP	Adenosine triphosphate
CAMP	cyclic adenosine monophosphate.
CaATP	calcium adenosine triphosphate.
DNA	Desoxyribonucleic acid
RNA	ribo nucleic acid.
ALP	alkaline phosphatase.
P	Phosphorus

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I- GENERAL INTRODUCTION AND AIM OF WORK .



II- REVIEW OF LITERATURE

A - CALCIUM

(1) Calcium Metabolism:

a- Introduction:

Calcium is primarily an extracellular ion and is maintained in the extracellular compartment by active transport. The proper calcium concentration is necessary to maintain normal structure and function of the cell membrane. Calcium is the bulk structural element in the skeleton and alteration of calcium metabolism are associated with skeletal changes. However non skeletal calcium is an essential metal for vital processes, specially nerve conduction and muscle contraction. (Hughes, 1977).

b- The normal values of serum calcium:

The normal serum total calcium concentration varies only slightly with age and ranges between 8.8 and 10.6 mg/dl, 5.5 mg/dl of diffusable calcium and 4.5 mg/dl is protein - bound. (Mary and William, 1984).

Lactating women in the immediate post-puerperal months (that is, 7th week to the 10th month post-partum)

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had a mean calcium of 9.3 ± 0.5 mg/100 ml in the 7th month to the 12 month post-partum period (Fenuku & Earl-Quo Quarcoo, 1977).

(2) Sources of Calcium:

In the fetus, calcium is derived from the mother

via an active placental calcium transport mechanism

involving a calcium and magnesium stimulated ATPase.

In the last trimester, maternal-fetal calcium transfer

approximates 100 to 150 mg/kg of fetal weight/day.

Fetal blood and cord blood of infants have serum concen-

tration of total and ionized calcium significantly

greater than maternal levels. At birth, the maternal-

fetal calcium supply is abruptly withheld from the

infant, resulting in decreased extracellular calcium

concentration. An increase in exogenous calcium supply

should be helpful, but in clinical practice, exogenous

calcium supply is minimal or unavailable at this age.

Endogenous calcium supply from bone serves as the

"buffer" in this situation (Tsang et al, 1976).

The high calcium content of milk is nearly all bound as calcium citrate or colloidal calcium phosphate. At the pH of milk (about 6.8) the citrate content is sufficient to complex nearly half the total calcium

s are reached 24 spontaneous return In usual circum- for a week or more.

a decrease in the first few days has been defined nts using measure- first 3 days of $Ca < 3.5$ or 3.0 premature infants. hypoxia and half of diabetic mothers

The major finding in the hypocalcemic group is the prevalence of undetectable or inappropriate low serum Parathyroid Hormone (PTH) levels before as well as after 48h of birth (David & Anast, 1974).

Acute neonatal hypercalcaemia is most commonly due to iatrogenic causes. Hypercalcaemia often results from intravenous calcium salt therapy with doses exceeding 75 mg elemental calcium/kg/day, or particularly from calcium salts given as rapid "push" infusion. (Tsang et al, 1976).

(4) Intestinal absorption of calcium:

Intestinal absorption of calcium has an absolute requirement for Vitamin D and is related to the demands of the body. Calcium absorption increases as a linear function depending on dietary intake in the range of 0-400 mg/day. Above 400 mg/day calcium absorption decrease rapidly. Approximately 36-50% of the ingested calcium is absorbed depending on the age of the child. (Hughes, 1977).