FLUID INTAKE AND WEIGHT LOSS DURING THE FIRST TEN DAYS OF LIFE AND RISK OF BRONCHOPULMONARY DYSPLASIA IN (VLBW) INFANTS

Thesis
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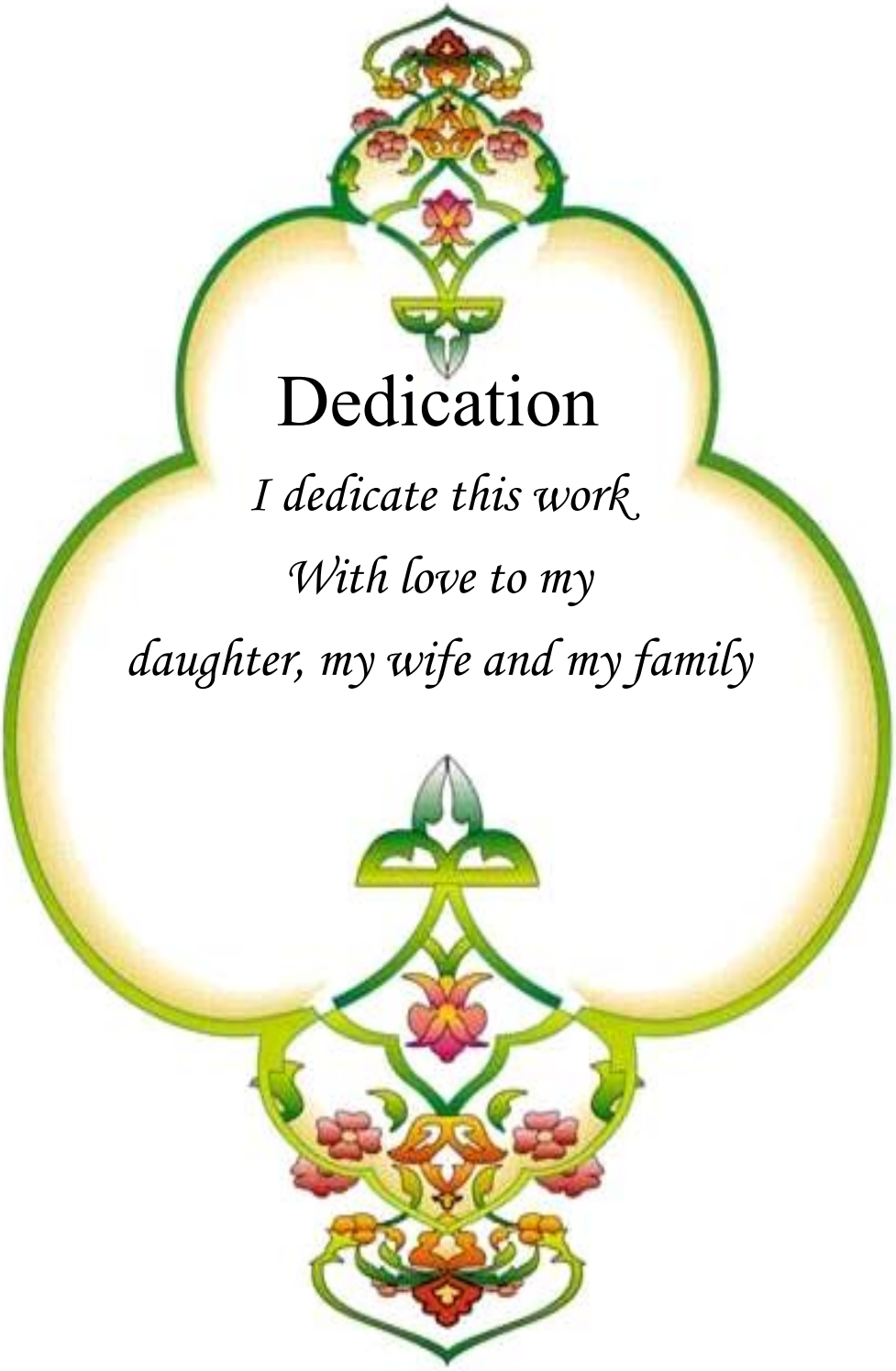

Dedication

I dedicate this work

With love to my

daughter, my wife and my family

ACKNOWLEDGMENT

First and Foremost, Thanks are all to "**ALLAH**".

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LIST OF ABBREVIATIONS

ABG	Arterial blood gasses.
AGA	Appropriate for gestational age.
APH	Antepartum hemorrhage.
B.W	Birth weight
BPD	Broncho pulmonary dysphasia.
CBC	Complete blood count.
CI	Confidence interval.
CLD	Chronic lung disease.
CPAP	Continue positive airway pressure.
CRP	C–reactive protein.
D.M	Diabetes mellitus.
D١٠ W	Dextrose ١٠ % in water
D٥W	Dextrose ٥% in water
ELBW	Extremely low birth weight.
FIO٢	Fraction of inspiratory oxygen.
G.A	Gestational age.
H.S	Highly significant.
ICH	Intra cranial hemorrhage.
IUGR	Intra uterine growth retardation.
IVH	Intraventricular hemorrhage.
L/S ratio	Lecithin to sphingomilin ratio.
LBW	Low birth weight.
LGA	Large for gestational age.
MOD	Mode of delivery .
N.S	Non significant .

NBW	Normal birth weight .
NEC	Necrotizing enterocolitis .
NICU	Neonatal intensive care unit.
P	Probability .
Pa O_2	Pressure o^2 .
PCO_2	Pressure co_2 .
PDA	Patent ductus arteriosus .
PEEP	Peak end expiratory pressure .
PIP	Peak inspiratory pressure.
PPV	Positive pressure ventilation.
PROM	Premature rupture of membrane.
PT	Preterm.
RDS	Respiratory distress syndrome.
ROP	Retinopathy of prematurity.
S	Significant.
SD	Standerd deviation.
SGA	Small for gestational age.
SO^2	Oxygen saturation.
SOD	Super oxide dismutase.
SRT	Surfactant replacement therapy.
t	Student t test
VEGF	Vascular endothelial growth factor
VLBW	Very low birth weight.
X^2	Chi square test.

INTRODUCTION

Infants were defined as suffering from Bronchopulmonary dysplasia (BPD) if they were on oxygen support ≥ ٢٨ days. These newborns were then reassessed when they reached ٣٦ weeks corrected GA (if GA<٣٢ weeks) or at hospital discharge ***(Ehrenkranz et al., ٢٠٠٥).***

Those who were room air at the time of reavaluation were classified as having mild BPD. Those receiving less than ٣٠% fraction of inspired oxygen (FiO_2) were classified as having moderate BPD and those on FiO_2 >٣٠% and/or continous positive airway pressure (CPAP) and/or mechanical ventilation were classified as having severe BPD ***(Ehrenkranz et al., ٢٠٠٥).***

BPD is still the most common cause morbidity among (VLBW) newborns, although the incidence, risk factors and severity of the disease have changed substantially since the introduction of new treatments and mechanical ventilation techniques ***(Monte et al., ٢٠٠٥).***

Pathogenesis of BPD is multifactorial, including immaturity, barotrauma or volutrauma and oxygen toxicity ***(Bancalari et al., ٢٠٠٣).***

Excessive ingestion of liquids and sodium in these high risk neonates during the early postnatal period has

been suggested as an additional risk factor for the development of BPD ***(Hartnoll et al., ٢٠٠٠).***

Body water content is very high in VLBW infant and a large proportion of the body water is in the extracellular fluid (ECF) compartment. During the first week of life, there is a physiologic contraction of the ECF which is associated with weight loss during the early neonatal period. This is achieved by fluid intake that is less than the amount of water excreted through the kidney in the form of postnatal diuresis and via insensible water loss. It is postulated that this physiologic process of ECF contraction may not occur if excessive fluid and/or sodium is given during the critical period ***(Oh et al., ٢٠٠٥).***

High fluid intake with persistent expanded ECF is associated with a higher incidence of symptomatic patent ductus arteriosus (PDA) and necrotizing enterocolitis (NEC), also there is suggestive evidence that PDA is associated with an increased incidence of (BPD) ***(Oh et al., ٢٠٠٥).***

Strategies and interventions that might reduce the incidence of BPD have been widely investigated. Recently, on a multicenter study, it was reported that administration of caffeine during the first days of life was capable of reducing (BPD) incidence in a population of VLBW newborns ***(Schmidt et al., ٢٠٠٦).***

AIM OF THE WORK

The aim of this work is to demonstrate the association between fluid intake and weight loss during the first ١٠ days of life and the risk of bronchopulmonary dysplasia (BPD) in VLBW infants.

Chapter (١)

PREMATURE AND LOW BIRTH WEIGHT INFANTS

Definitions:

The World Health Organization defined **preterm infants**, as live born infants delivered before ٣٧ weeks from the first day of last menstrual period. Birth weight is governed by two major considerations, the duration of gestation and the intrauterine growth rate. **Low birth weight (LBW)** that is birth weight equal to or less than ٢٥٠٠ gm. may be caused by a short period of gestation, intrauterine growth retardation (IUGR) or both ***(Graham, ٢٠٠٢).***

Very low birth weight (VLBW) infants are infants who weight less than ١٥٠٠ gm, while **extremely low birth weight infants (ELBW)** are infants who weigh less than ١٠٠٠ gm. Both of them are predominantely premature, but some are small for date at a later gestation ***(Stoll and Kleigman, ٢٠٠٨).***

LBW infants can be grouped into three categories, firstly, infants with LBW who are prematurely delivered (before ٣٧ weeks) and are appropriate for gestational age (Preterm- AGA). Secondly, infants with LBW who are born at ٣٧ weeks or later, and inappropriately small for gestational age (SGA). Lastly, infants who are prematurely

delivered but whose weight is still inappropriately small for gestation age (Preterm -SGA) ***(Lee and Cloherty, ٢٠٠٨).***

In developing countries, approximately ٧٠% of LBW have intrauterine growth retardation, while in developed countries ٣٠% of LBW have IUGR. Intrauterine growth retarded infant (I U G R), have a greater morbidity and mortality than appropriately grown gestational age infants ***(Stoll and Kleigman, ٢٠٠٨).***

Incidence:

The incidence of prematurity is very difficult to be determined, until recently, all low birth weight babies were lumped together as being premature. The incidence of hospital births below ٢٥٠٠ gm, is approximately ٧.٦% in the United States, ٦.٥% in Great Britain, ٥.٥% in Sweden, ٧% in France, and ١٠% in Japan. The low birth weight rate has increased because of an increased number of preterm births. ٣٠% of LBW infants in the United States have IUGR and were born after ٣٧ weeks. VLBW infants weigh less than ١٥٠٠gm and are predominately premature. In the United States, the VLBW rate is approximately ١.٤% and their survival is directly related to birth weight ***(Horber et al., ٢٠٠٢).***

In order to have the incidence of prematurity in Egypt, we should have national or semi-national survey and this