



## The effect of breast feeding on mortality and weight gain in small for gestational age infants.

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### ABSTRACT

**Background** Small for gestational age as a term is used to define infant with a weight below 10th percent for gestational age or more than 2 standard deviations below mean for gestational age. The highest incidence of the adverse perinatal outcomes may be contributed to the intrauterine growth restricted infants.

**AIM OF THE STUDY:** To study the effect of breast feeding on outcome and weight gain in small for gestational age infants.

**Methodology:** A cross sectional study was carried on 61 small for gestational age New born < 1 week admitted to Neonatal Intensive Care Unit in Pediatric AL-ILWIYA Hospital in Baghdad and interviewed with mother by using detailed questionnaire

**Result:** The fatality rate for small for gestational age infants was 31.9%. The lowest death rate was found in breast fed neonates. In addition, the mean value for percent changes in body weight after two weeks compared to first week after birth was significantly higher to small for gestational age depending on breast fed compared with other type of feeding.

**Conclusion:** this study strengthen the importance of breast feeding for small for gestational age infants since the weight gain in breast fed neonates was higher compared to bottle or to mixed fed neonates and improving their outcome.

**KEYWORDS :** small for gestational age (SGA), Neonatal Intensive Care Unit (NICU).

**INTRODUCTION** The (WHO) defined small for gestational age (SGA) as any infant weight less than (2500 gram) at birth and delivered after 37 completed weeks of gestation (1).

Small for gestational age infants may experience numerous complications in the neonatal period related to the etiology of the growth insult as well as antepartum factors. (1)

Approximately 30% of (SGA) infants In the United States have IUGR and are born after 37 weeks of gestation. In developing countries 70% of them have IUGR (1).

Regarding Arab countries the incidence of SGA in Oman (9%), Jordan (10%), (15), In a study done in Baghdad during May 2009, the prevalence of SGA was 21.3% (2).

#### Causes of low birth weight;

Strong positive correlation exists between both SGA and low socioeconomic status. Families of low socioeconomic status have relatively high incidence of maternal under nutrition, anemia, inadequate antenatal care, obstetric complications, maternal history of reproductive insufficiency (relative infertility, abortion, stillbirths, premature), smoking, and genitourinary tract infection (1), so the greater socioeconomic deprivation, the slower the rate of fetal growth. (3)

Other associated factors like, teenage pregnancies, close spacing of pregnancies, and mother who have born more than four previous children are also encountered more frequently (1)

#### Neonatal problems of small for gestational age infants;

##### 1-Neonatal asphyxia and meconium aspiration:

Approximately one half of infants with IUGR have asphyxia and meconium aspiration so they act as a major cause of morbidity and mortality in IUGR babies (4).

##### 2-Hypoglycemia.

##### 3-Polycythemia-Hyperviscosity:

Is observed three to four times more frequently in the growth restricted infant secondary to intrauterine hypoxia.

#### 4-Hypothermia:

Is another common problem of the growth restricted infants and results from decrease body fat stores secondary to intrauterine malnutrition (5).

#### 5-Persistent Fetal Circulation:

Is a common sequel of prenatal hypoxia and acidosis that results in persistent blood flow through the ductus arteriosus (1).

#### 6-Dysmorphology:

Results from chromosomal-genetic disorders, oligohydramnios induced deformations, TORCH infection (1).

#### Neonatal Diagnosis

Reduced birth weight for gestational age "light for dates" is the simplest and oldest method of diagnosis; wasted or disproportionate growth, soft tissue wasting, diminished skin fold thickness, decreases breast tissue, and reduced thigh circumference suggest recent wasting and are useful measurement for neonatal diagnosis (6).

Widened skull sutures with large fontanells; shortened foot femoral and crown-heel length, and delayed development of epiphyses suggest longer-term failures in bone growth. Head circumference may be reduced in some of them (7). Combinations of measurements such as weight/ head circumference, crown-heel length/ head circumference, and birth weight/ crown-heel length, are being used more frequently to assess disproportionate pattern of fetal growth (8).

#### Management:

The key to proper management is early diagnosis and meticulous care and also proper attention to risk factors, careful clinical and chemical, evaluation, and utilization of newer ultra sonographic techniques should lead to detection of most SGA babies before birth.

At birth, the measures needed for clearing the airway, initiating breathing, caring for the cord and eye and administering of vitamin K are the same in immature infants as in those of normal weight and maturity, special care is required to maintain a patent airway and avoid potential aspiration of gastric contents.

Additional considerations are need for:

- 1) Incubator care, heart rate and respiration monitoring.
- 2) Oxygen therapy.
- 3) Special attention to details of feeding and safeguards against infection can never be relaxed (1).

**Criteria for Hospital Discharge:**

The new criteria used to decide on the readiness for discharge include the following:

Medical or surgical problems, *that require continued hospitalization*, must be absent.

Weight gain (15-30 g/d) must continue over a reasonable time (several days to 1 wk) (9).

Weight gain must be associated with ability to feed either orally or by other methods (e.g., gavage tube feeding) and feeding must be accomplished without any distress or problems.

Weight gain must have occurred while the infant was kept in an open environment. The infant must have been clothed appropriately and the body temperature maintained in the normal range for a number of days in this environment (i.e., thermal stability).

Parents must be trained adequately in all aspects of the preterm infant's care including the use of technical devices (e.g., monitoring), administration of medications and nutritional support (1).

**Home care**

While the infant is in the hospital, the mother should be instructed how to care for the baby after discharge. This program should include at least one visit to her home by someone capable of evaluating domestic arrangements and advising about any needed improvements (1).

**Subjects and Methods**

**Study design:**

It is a descriptive cross-sectional study.

**Setting:**

This study was carried out in neonatal intensive care unit (NICU) in Al-Ilweya hospital in Baghdad.

**Time of study:**

Collection of data was carried out during period from first of February to the first of June 2016.

**Sample size:**

The study done on 61 small for gestational age, comparative group of full term neonates (birth weight >2500g, age ≤ 1 week) was selected from newborns consulting same hospital for BCG vaccination, birth wt. of included neonates was recorded from "birth certificate".

**Inclusion criteria:**

Subjects included in this study were defined as follow: SGA: newborn delivered after 37 completed week of gestation who are small for gestational age "termed growth-restricted neonate" and with birth weight less than 2500 gm.

Full term neonate (birth weight > 2500g, age ≤ 1 week).

**Exclusion criteria:**

SGA who were healthy, no problems, not admitted and whose information were incomplete.

**Ethical consideration:**

This study was approved by the Scientific Council of Family Medicine. The permission to conduct the study was given by the manager of the hospital.

Each mother was informed about the purpose of the study to

ensure better response and verbal consent was taken from them.

**Methods:**

SGA infants were diagnosed depending on birth weight less than 2500 gm in full term infants and on clinical features such as soft tissue wasting, diminished skin fold thickness, decrease breast tissue and reduced thigh circumference. (57).

Gestational age values were used for identification of SGA subjects whose mother did know their last menstrual period.

The study groups were followed until death or discharge from the hospital.

**Limitation of study:** loss of neonates during follow up.

**Statistical analysis:** distribution of these groups according to various variables studied and the association between these variables and outcome were tested. A critical value of P < 0.05 was used as the criterion for determining statistical significance.

**Results**

**Fetal gender and Type of feeding:-**

Table (1): The highest proportion of neonates was female and breast fed infants, the difference in proportion of gender and breast feeding between SGA and NBW groups were not significant (P > 0.05).

**Table (1) Distribution of neonates in the study groups according to the gender and type of feeding.**

Gender	SGA Group		N.B.W		P VALUE
	No.	%	No.	%	
Female	34	55.7	39	39	> 0.05
Male	27	44.3	61	61	
Type Of Feeding					
Breast	40	65.6	72	72	> 0.05
Bottle	18	29.5	15	15	
Mixed	3	4.9	13	13	

**Outcome:-**

Table (2): About 2/3 of two groups were discharged on good health and 1/3 died.

**Table (2) Distribution of the study groups according to outcome on discharge.**

Outcome on Discharge	SGA Group	
	NO.	%
Survivors (good health)	32	68.1
Death	15	31.9
Total	47	100

\* Note: there are 14 SGA neonates were discharged on family responsibility

**Relation between death and sex and type of feeding:-**

Table (3). Regarding sex: The highest proportion of death (43.5% among SGA group) was male; the difference in proportion was not significant. Regarding type of feeding: The lowest proportion of death occur in breast feeding neonates, the difference in proportion was statistically significant in SGA group

**Table (3) the relation between the outcome (death) in study groups with the sex and type of feeding of infants**

	SGA Group (Death)			P value
	Total No.	No.	%	
Sex				
Female	24	5	20.8	
Male	23	10	43.5	>0.05
Type of feeding				
Breast	32	8	25	<0.05
Bottle	13	6	46.2	
Mixed	2	1	50	

### Percent change in body wt. (g) after two weeks compared to first after birth:-

Table (4): Shows the mean  $\pm$  SE of percent change in body weight (g) after two weeks compared to first week after birth for the study groups according to sex and type of feeding

**Table (4) the mean  $\pm$  SE of percent change in body weight (g) after two weeks compared to first week after birth for the study groups**

Percent Change In Body Wt.(g) After 2 Weeks Compared To First Week After Birth	SGA Group			NBW Group			t-Test		P- Value
	Mean	SE	N	Mean	SE	N	SGA & NBW	SGA & NBW	
Sex Female	2.5	1.58	32	11.3	0.45	39	5.35	< 0.001	
Male	1.8	1.81	21	11.7	0.35	61	5.37	< 0.001	
Type of feeding									
Breast	3	1.55	36	12.27	0.29	72	5.88	< 0.01	
Bottle	0.4	1.81	15	9.5	0.72	15	4.67	< 0.01	
Mixed	1.8	6.79	2	10.3	0.96	13	1.24	> 0.05	

Note: 8 of SGA group were discharge on family responsibility.

### Discussion

Concerning gender, the highest proportion of SGA group were females and this proportion was significantly higher than that in the NBW group. A study done by Meda et al., (1995) showed that female sex fetuses were associated with increased risk of IUGR (10)

Regarding types of feeding, this study showed that the highest proportion of SGA and NBW groups were breast fed and this agrees with a study done by Dip et al., (2000) which found that breast feeding is responsible for the majority low birth weight, regardless of socioeconomic status. (11)

From the follow up of the infants in the study groups, the fatality rates for SGA groups were 31.9 % these values were higher than what had been reported by Ahmed (1994) who showed that the mortality rate in full term low birth weight (SGA) group was (11.1%), this rate may be due to small sample size of the study groups. (12)

Regarding the relation between death and sex of neonates for SGA group, death found in 43.5 % of male and 20.8 % of female

The "male disadvantage" with respect to neonatal mortality has been recognized, for more than two decade, Brothwood et al., (1986) confirmed "the relative vulnerability of boys to perinatal mortality and morbidity, they observed a higher mortality in IUGR boys than in girls. (13)

Another study done by Stevenson et al., (2000) which reported that mortality for LBW male are higher than female. (14)

Regarding type of feeding our study showed that the lowest death rate were with breast feeding neonates, and this comparable to Botting et al study, (1997) which stated that breast feeding is valuable for premature and LBW infants who are known to be at great risk of health and developmental difficulties. (15)

When type of feeding was adjusted, the mean of percent change in body weight was significantly higher in SGA group for breast fed infants and this agrees with a study done by Asindi et al., (1998) which found that mortality is closely related to the percent change in body weight. (16)

### Conclusions

The fatality rate of SGA neonates was 31.9%, highest death rate was found in males, lowest death rate was found in breast fed infants. The mean birth weight and the percentage in weight changes after 1 week

and after 2 weeks in SGA group was significantly higher in breast fed neonates compared to bottle fed or mixed fed neonates.

### Recommendations

The role of breast feeding in maintaining adequate weight gain and improving the outcome of neonate should be clarified so that the mother will maintain on breast feeding after discharge.

Health education should be done through Primary Health Center about the risk factors related to SGA and premature births.

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