Results

This study was carried out on preterm babies' gestational age between (32-34 wks) who were divided two groups group1 fed exclusive breastfeeding only and the other group II fed artificial formula.

Those groups selected from babies attended neonatal intensive care unit; this study uses FADS2 gene expression to assess the cognitive function of preterm. The researcher was responsible for taking the height, weight, head circumference and collect samples for measurement FADS2 gene expression during the period of the study.

Demographic data of the studied group:

Table (4) shows that age of mothers ranged from below 25 years to 30 years. Also the majority of mothers (76%) were educated and the majority of them resided in rural areas (82.2%). there was non-significantly difference ($p>0.05$) related to demographic data of studies groups.

Table (4) : Demographic Data of the studied groups

Parameter	Group	Group I Preterm fed Exclusive Breastfeeding (PET – BF) N= 15		Group II Preterm fed Artificial Feeding (PET – AF) N= 15		P
		No.	%	No.	%	
Residence	R	10	66.7	9	60	>0.05
	U	5	33.3	6	40	
Mother Education	Illiterate	4	26.7	5	33.3	>0.05
	Primary	3	20	4	26.7	
	Secondary	4	26.7	2	13.3	
	High	4	26.7	4	26.7	
Mother Age	< 20	5	33.3	4	26.7	>0.05
	20 – 30	3	20	4	26.7	
	31 – 40	3	20	3	20	
	> 41	4	26.7	4	26.7	
Father Occupation	Unemployed	3	20	4	26.7	>0.05
	Civil	3	20	3	20	
	Professional	4	26.7	3	20	
	Manual	2	13.3	2	13.3	
	Sales	3	20	3	20	

Table (5): Frequency of distribution of Studied groups by gender

Groups / Parameter	Group I (PET-BF)	Group II (PET- AF)	X^2	p
	Number (%)			
Female	8/15 53.3	6/15 40	0.2	>0.05
Male	7/15 46.7	9/15 60		

Comment:

Tables (5) show that there is non –significant difference related to gender of groups.

(P value >0.05): non- significant difference.

(P value <0.05): significant difference.

Table (6): Mean and± standard deviation (± SD) of head circumference over the period of follow-up (0-12 weeks) in-between the studied groups

Group / Head circumference (cm)	Group I (PET-BF)	Group II (PET-AF)	p
	Mean ± SD		
At birth (o)	29.47± 0.52	29.2 ± o.1	P>0.05
2 weeks	30.23±0.73	29.5± 0.1	P>0.05
4 weeks	31± 0.1	31.0 ± 0.1	-----
8weeks	33.0±0.1	33.27±0.7	P>0.05
12 weeks	35.0±0.1	35.0±0.1	-----

Comment:

Table (6): shows the mean ± SD of head circumference in cm of the neonates over the period of follow-up from birth to 12 weeks (0-12 wks) among the studied groups. Non –significant difference between groups.

Table (7): Mean and standard deviation (± SD) of length-for age (L/A) over the period of follow-up (0-12 weeks) in-between the studied groups

Groups / Length(cm)	Group I (PET-BF)	Group II (PET-AF)	p
	Mean ± SD		
At birth (o)	44.7± 0.88	44.2±1.08	P>0.05
2 weeks	45.7±0.79	45.6±0.99	P>0.05
4 weeks	47.47±0.83	47.17±0.77	P>0.05
8weeks	49.3±0.62	49.47±0.92	P>0.05
12 weeks	51.27±0.7	51.2±0.88	P>0.05

Comment:

Table (7): shows the mean ± SD of Length-for-age (L/A) in cm of the neonates over the period of follow-up from birth to 12 weeks (0-12 wks) among the studied groups. Non –significant difference between groups.

Table (8): Mean and standard deviation (± SD) of weight increments in grams of subjects from birth to 12 weeks among the studied groups

Weight increment in grams / Age in weeks	Group I (PET-BF)			Group ll(PET-AF)			P
	Mean ± SD		Growth rate grams\week	Mean ± SD		Growth rate grams\week	
At Birth	2160	±220		1900	±140		<0.05
2	2640	±220	240	2270	±190	185	<0.001
4	3270	±250	315	2590	±290	160	<0.001
6	3900	±0.31	157	3380	±290	197	<0.001
8	4550	±220	162	4040	±410	165	<0.001

Comment:

Table (8) and figure (1): shows the mean ± SD of weight-for-age (W/A) in grams of the neonates over the period of follow-up from birth to 12 weeks (0-12 wks) among the studied groups. The breast milk fed group demonstrated statistically significantly higher increments in weight gain in the first 8 weeks (P<0.001). While infant milk formula fed group showed delayed catch up later at 8 weeks of age but final weight at three month was still significantly higher in the breastfed group.

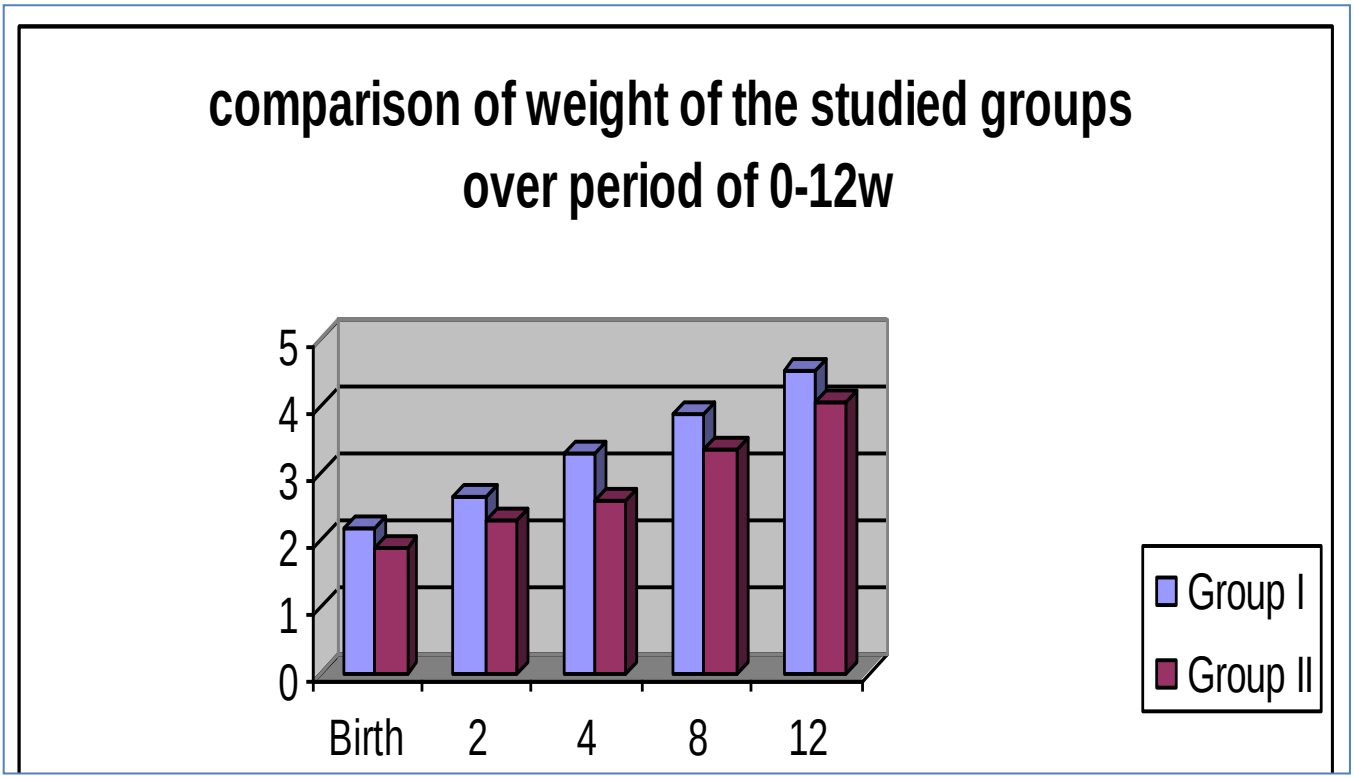


Figure (1): Comparison of weight of the studied groups over period of0-12 weeks

Table (9): Comparison between breastfed and the artificially-fed groups as regards laboratory parameters at 3 months of age

	Breastfed (N=60)		Artificially fed (N=60)		*T*	*P*
	Mean	**± *SD***	***Mean***	**± *SD***		
RBC (×10) 6	4.5167	0.32995	4.3767	0.22351	2.721	0.008**
MCV (fl)	79.4667	2.58724	78.4167	2.66358	2.19	0.03*
MCH (pg)	24.85	1.102	24.8167	1.15702	0.162	0.872
Hb (g/dl)	12.2767	0.40058	12.05	0.40021	3.101	0.002**
WBC (×10) 3	7.69	2.43204	7.125	1.72731	1.467	0.145
Platelets (×10) 3	272.75	57.95253	277.85	49.05612	0.520	0.604

Comment:

Table (9) : show a statistically significant difference in RBC, MCV and HB between breastfed and artificially-fed groups although both were within the normal range (P<0.05). There was no significant difference as regards to mean corpuscular hemoglobin (MCH), white blood corpuscular (WBC) and platelets between breastfed and artificially-fed groups (P>0.05).

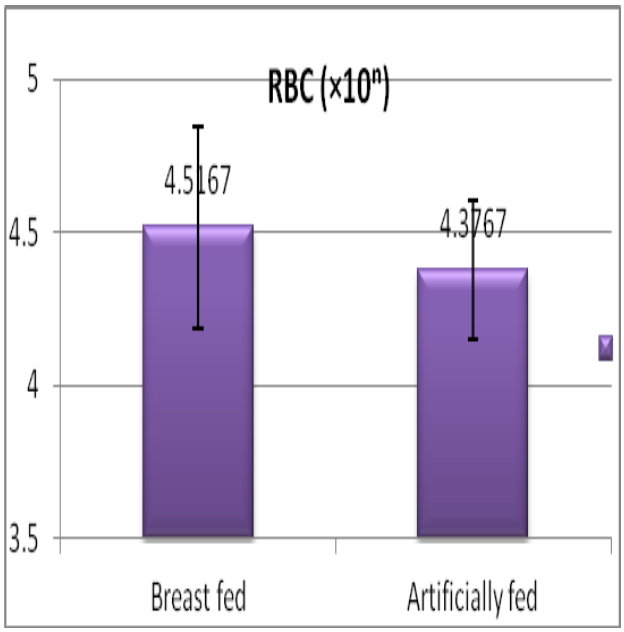


Figure (2): Comparison in Red Blood Count(RBCs) for breastfed and artificially fed groups under study at 12 weeks of age and it shows increase in breast fed group

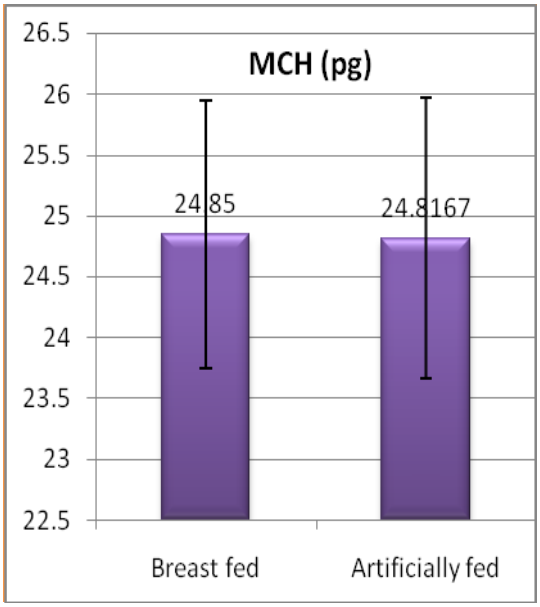


Figure (3): Comparison in mean corpuscular hemoglobin (MCH) for breastfed and artificially fed groups under study at 12 weeks of age and it shows no difference between them.

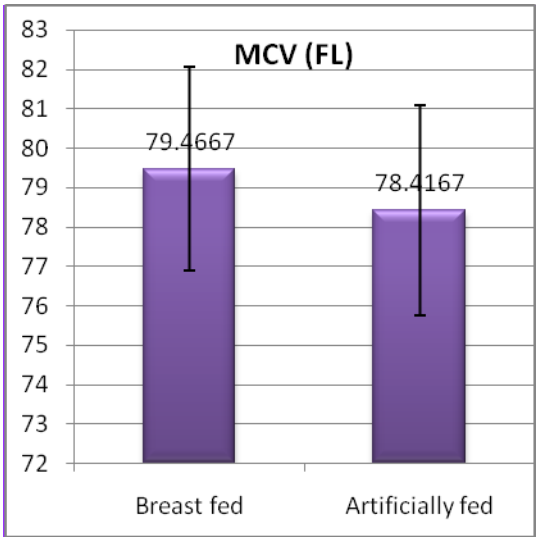


Figure (4): Comparison in Mean Corpuscular Volume MCV for breastfed and artificially fed groups under study at 12 weeks of age and it shows no difference between them.

Table (10): Mean and standard deviation (± SD) values of FADS2 mRNA values (Relative Unit) at birth and at 3 months of the two groups:

FADS2 mRNA (Relative Unit) / Age in weeks	Group I Preterm fed Exclusive Breastfeeding (PET-BF) N= 15	Group II Preterm fed Artificial milks (PET-AF) N= 15	p
	Mean ± SD		>0.05
Birth (0)	21296.8 ± 85187.2 (No. =30)		
12 weeks	2321351.2±6443703.5	77378.3±942237.4	<0.001

Comment:

Table (10): shows that there is a statistically significant increase in FADS2 mRNA levels of preterm exclusively breastfed (group I) as compared to those who fed artificial feeding (group II), p<0.001.

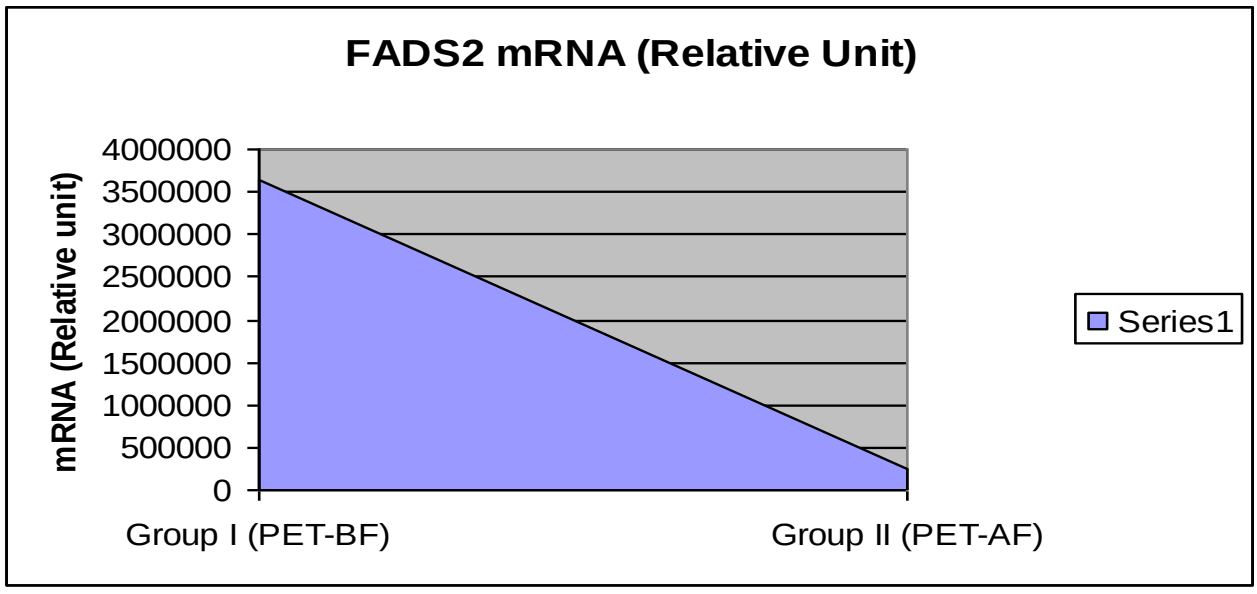
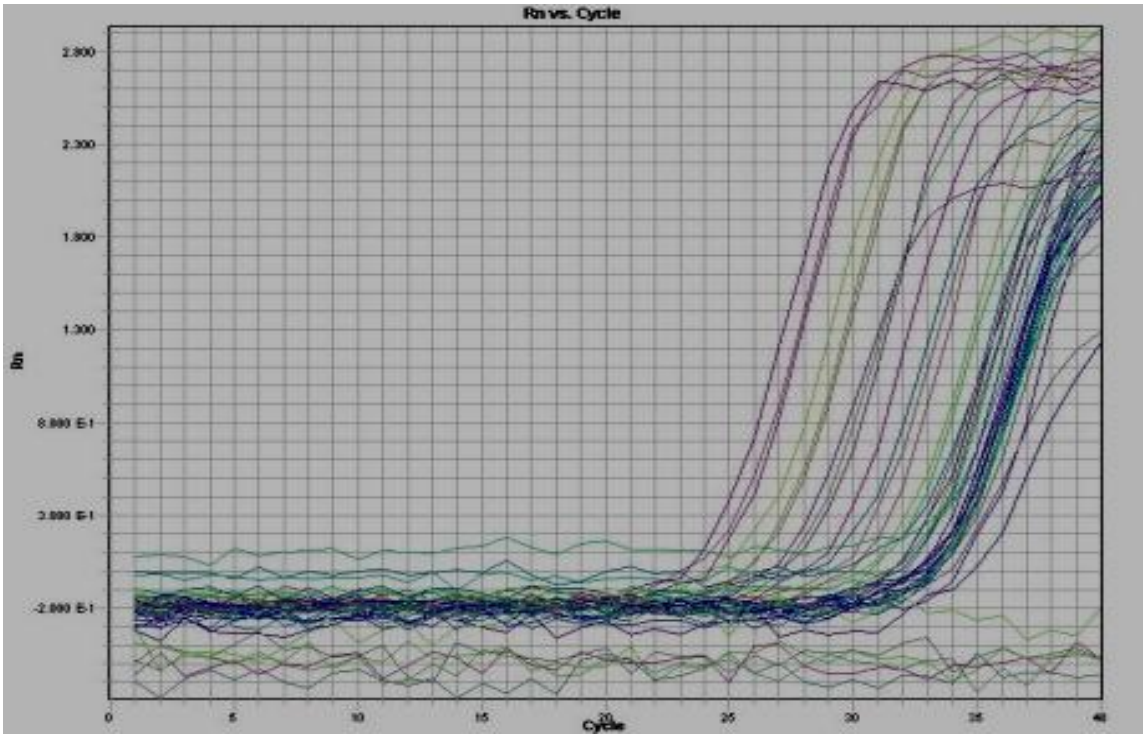


Figure (5): FADS2 mRNA (Relative Unit) Values of the two groups



Figure(6): indicates post-run amplification plots of group I and group II for FADS2 mRNA as selected target detector and GAPDH mRNA as housekeeping detector (endogenous controls) ΔRn: Dye fluorescence as a function of cycle number.

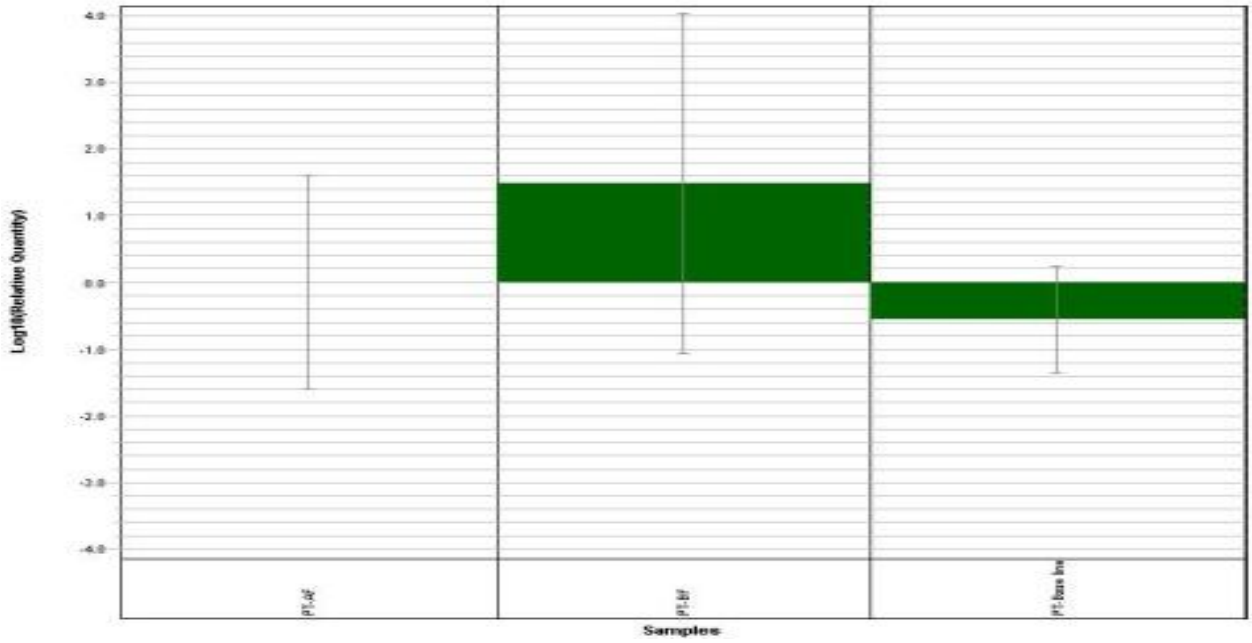


Figure (7): Gene expression levels of FADS2 mRNA for both two groups samples are indicated by green bars. This color also indicates the samples in RQ. Because group II samples are used as calibrators, the expression levels are set to one. But because the expression levels were blotted as log10 values (and the log 10 of 1 is 0), the expression level of the group II samples appears as zero in the graph. Fold expression changes are calculated using 2-ΔΔCT. The FADS2 mRNA expression levels were 109 folds higher in infants who were exclusively breastfed in the first 12 weeks versus those who fed artificial milk.

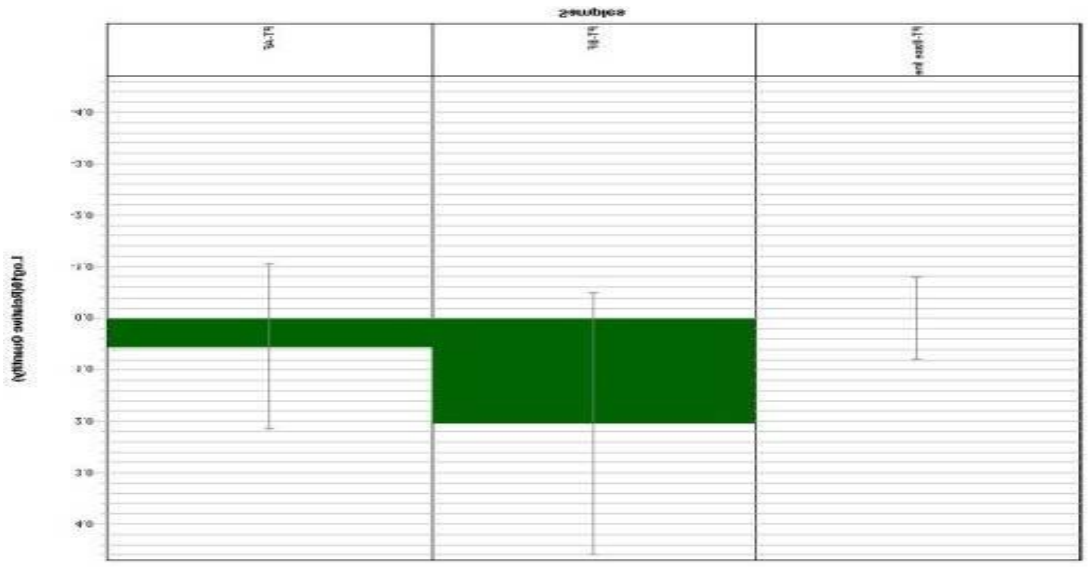


Figure (8): Gene expression levels of FADS2 mRNA for both two groups samples are indicated by green bars. This color also indicates the samples in RQ. Because samples at zero time are used as calibrators, the expression levels are set to one. But because the expression levels were blotted as log10 values (and the log 10 of 1 is 0), the expression level of the Zero time samples appear as 0 in the graph. Because the relative quantities of the FADS2 mRNA are normalized against the relative quantities of the GAPDH (endogenous control) , the expression level of the endogenous control is 0; there are no bars for GAPDH.

Table (11) : Comparing frequency distribution of clinical complications during stay in the neonatal intensive care unit in the studied groups

Clinical complications \ Group		Group I Exclusively breastfed (PET – BF) N= 15		Group II Fed artificial milks (PET – AF) N= 15		P
		No.	%	No.	%	
Jaundice	Yes	10	66.7	11	73.3	>0.05
	No	5	33.3	4	26.7	
Hypoglycemia	Yes	1	66.6	4	26.7	<0.05
	No	14	33.4	11	73.3	
Resuscitations	Yes	2	33.3	3	20	<0.05
	No	13	66.7	12	80	
NEC	Yes	0	0	4	26.7	-----
	No	15	100	11	73.3	
RD	Yes	2	33.3	7	26.7	<0.05
	No	13	66.7	8	73.3	
Sepsis	Yes	0	0	6	40	----
	No	15	100	9	60	

(P value<0.05): significant difference
(p value>0.05):no significant difference.

Table (12) : Mean and standard deviation of FADS2 expression in relation to the clinical complications during stay in the neonatal intensive care unit in the studied groups

Title		Breastfeeding Group (n = 15)				Artificial Feeding Group (n = 15)			
		Number	Mean	± SD	P-Value	Number	Mean	± SD	P-Value
1-Sepsis	Present	---------	-------	------	--------	5	14969.10	28720.93	
	Absent	15	2313894	3499454	<0.05	10	59428.40	45336.07	0.02
2- NEC	Present	--------	-------	-----	--------	2	22379.64	36694.40	
	Absent	15	2313894	3499454	<0.05	13	50164.25	46565.18	0.01
3-Hpoglycemia	Present	1	282948.0	3584444		5	35450.3	42854.76	
	Absent	14	2458962	32680.75	0.133	9	6259.000	3035.8644	0.24
4-Jaundice	Present	11	2920170	3949331		10	24193.4	40524.92	
	Absent	4	646636.0	322491.2	0.57	5	32586.60	41406.30	0.44
5-Resus	Present	3	276543	3804161		7	17336	32068	
	Absent	12	5077143	111430.2	0-295	8	44020	45419	0.189

Table (13) Correlations between mode of delivery and FADS2 gene expression

Title	Breastfeeding Group (n = 15)				Artificial Feeding Group (n = 15)			
	No.	Mean	± SD	P-Value	No.	Mean	± SD	P-Value
Mode of delivery								
Vaginal	7	6263150	12445.08	<0.05	4	27964	45687.9	>0.5
Cs+sa	6	3249343	43414		4	28101	45622.35	
Cs+ga	2	1994246	33051		7	18237	8465	

CS: cesarean delivery SA: spinal anesthesia, GA: general anesthesia, Hb: hemoglobin

Comment:

Table (13): shows significant difference between FADS2 gene expression and mode of delivery.