Results

The present study included 200 healthy full term newborns (117 males and 83 females). Our babies were divided into 2 equal groups, group (I) for the vaginally delivered neonates and group (II) for those delivered by cesarean section. Each group was further subdivided into 2 equal subgroups, one for the exclusively breastfed infants (Ia and IIa) and the other for the non-exclusively breastfed neonates (Ib and IIb). Our results have been summarized and illustrated in tables I - XIV and figures I - XII. Table I shows that both sexes were distributed with no significant differences between our study groups (P-value = 0.297).

Table I: Sex Distribution Among The Study Groups:

		Males	females
Group Ia		25	25
Group Ib		33	17
Group IIa		27	23
Group IIb		32	18
Total		117	83
chi-square	X^2	3.67	
	P-value	0.297	

Only, 110 of our neonates developed neonatal jaundice (serum bilirubin levels > 7 mg/dl). All of them had apparently physiological jaundice (after exclusion of the pathologic causes of jaundice). Only, 42 of the exclusively breastfed newborns became jaundiced (21 vaginally delivered and 21 delivered by cesarean section). But, 68 of the non-exclusively breastfed neonates became jaundiced (32 vaginally delivered and 36 delivered by cesarean section).

In table II and Figure I, we can see that the number of males with peak bilirubin levels > 12 mg/dl is more than double that of the females with such bilirubin levels. Otherwise, there were no statistically significant differences between the two sexes as regards their peak serum bilirubin levels.

Table II: Sex and Peak Bilirubin Level:

Peak Bilirubin Level		Males	Females
< 5 mg/dl		18	18
5–7 mg/ dl		25	19
7–12 mg/dl		27	23
> 12 mg/ dl		47	23
chi-square	X^2	3.693	
	P-value	0.2967	

Fig I: Sex and Peak Bilirubin Level:

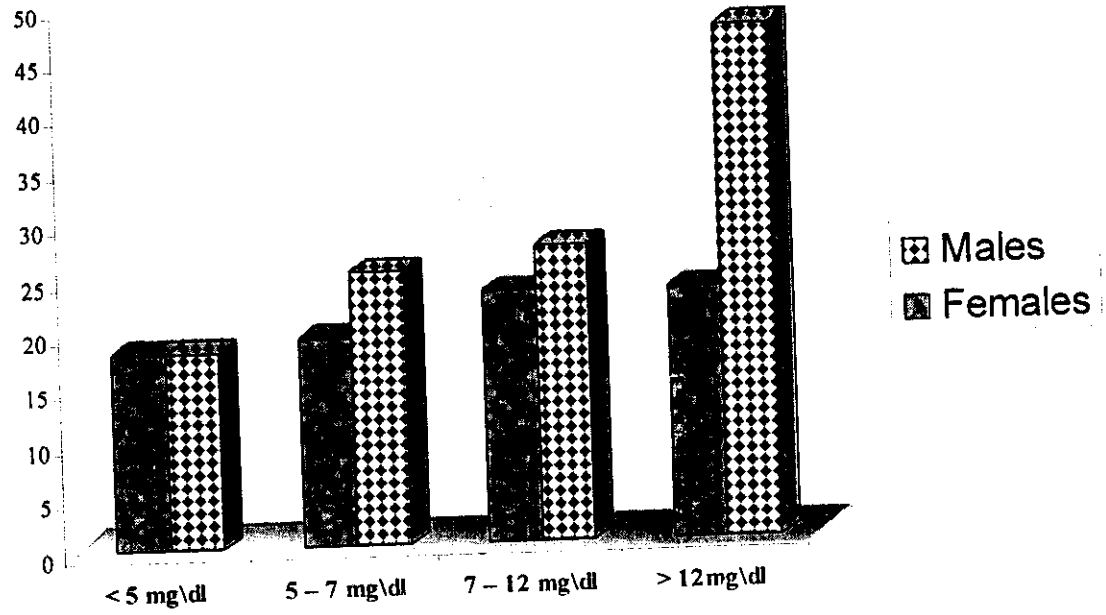


Table III shows feeding practices in the study groups. Proper feeding practices as rooming in, early skin to skin contact, early eye to eye contact, feeding 8 or more times per day, no bottle , no pacifiers, no prelacteals and no supplements were significantly more evident among the exclusively breast feeding mothers.

Table III: Feeding Practices:

	Group I				Group II					
	Group Ia		Group Ib		Group IIa		Group IIb		Chi-square	
	N	%	N	%	N	%	N	%	X^2	P-value
Rooming in										
- ≤ 24 h	50	100	38	76	50	100	32	64	38.118	0.00
- > 24 h	0	0	12	24	0	0	18	36		
Time of 1st breast feed										
- ≤ 2 h	46	92	15	30	41	82	12	24	79.906	0.00
- 2 – 6 h	4	8	26	52	9	18	33	66		
- 6 – 24 h	0	0	9	18	0	0	5	10		
- > 24 h	0	0	0	0	0	0	0	0		
Time of 1st eye & skin contact										
- ≤ 2 h	46	92	30	60	41	82	12	24	61.724	0.00
- 2 – 6 h	4	8	16	32	9	18	30	60		
- 6 – 24 h	0	0	4	8	0	0	8	16		
- > 24 h	0	0	0	0	0	0	0	0		
Freq. of feeding										
- ≥ 8	47	94	3	6	46	92	5	10	197.658	0.00
- 6 - 8	3	6	18	32	4	8	16	32		
- < 6	0	0	29	58	0	0	29	58		
Bottle Feeding										
- Yes	0	100	20	40	0	0	46	92	129.082	0.00
- No	50	0	30	60	50	100	4	8		
Pacifiers										
- Yes	0	100	33	66	0	0	41	82	120.206	0.00
- No	50	0	17	34	50	100	9	18		
Prelacteals										
- Yes	0	0	50	100	0	0	50	100	200	0.00
- No	50	100	0	0	50	100	0	0		
Supplements										
- Yes	0	0	5	10	0	0	18	36	42.594	0.00
- No	50	100	45	90	50	100	32	64		

In table IV and figure II we find that expressed breast milk feeding was more apparent among exclusively breastfeeding mothers who underwent cesarean section. The most common method of breast milk expression was manual expression.

Table IV: Breastfeeding Expression:

	Group Ia	Group IIa	Chi-square	
			X^2	P-value
Time of 1st breast milk expression				
- < 2 h	5	18	3.40	0.18
- 2 – 6 h	8	8		
- 6 – 24 h	3	5		
- > 24 h	0	0		
Frq. of BM expression				
- ≥ 8	12	23	1.29	0.52
- 6 - 8	4	3		
- < 6	2	3		
Staff showed mother				
- Yes	48	49	1.29	0.52
- No	2	1		
Mode of EBM feeding				
- Spoon	17	26	0.32	0.56
- Syringe	1	3		
Mode of EBM				
- Manual	18	29		
- Pump	0	0		

Fig II: Breastfeeding Expression:

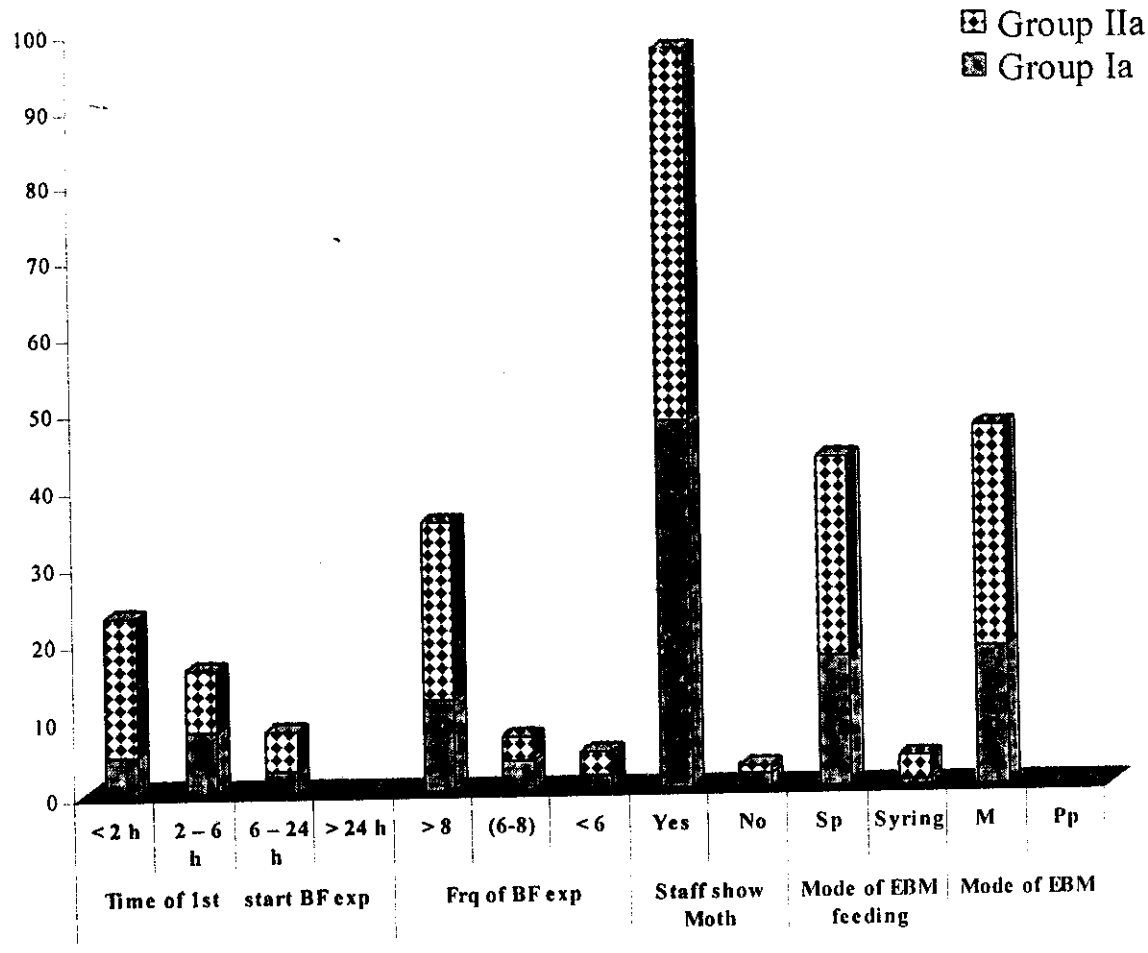
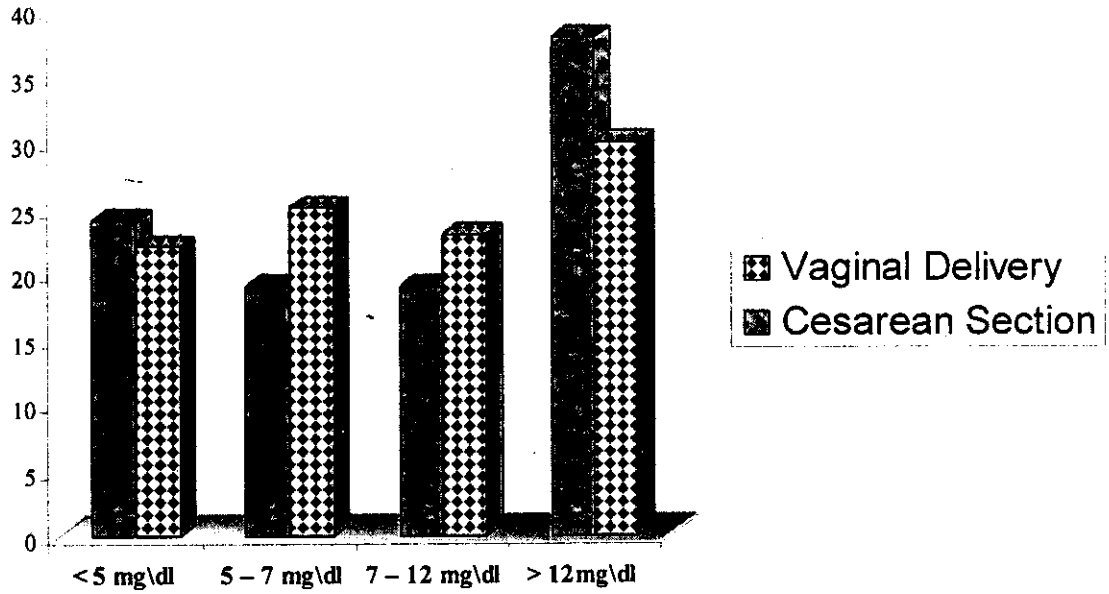


Table V and figure III show that the peak serum bilirubin levels of the exclusively breastfed infants were significantly lower than those of the non-exclusively breastfed neonates (P-value = 0). Moreover, we can see that only 42 % of the exclusively breastfed newborns were affected by neonatal jaundice with serum bilirubin levels > 7 mg/dl but, 66 % of the non-exclusively breastfed newborns developed such serum bilirubin levels.

Table V: Breastfeeding Practices and Peak Bilirubin Level:

Peak Bilirubin Level		Exclusive Breastfeeding	Non-exclusive Breastfeeding
≤ 5 mg/dl		32	14
5–7 mg/dl		26	20
7–12 mg/dl		20	22
> 12 mg/dl		22	44
chi-square	X^2	23.333	
	P-value	0.000	

Fig IV: Mode of Delivery and Peak Bilirubin Level:

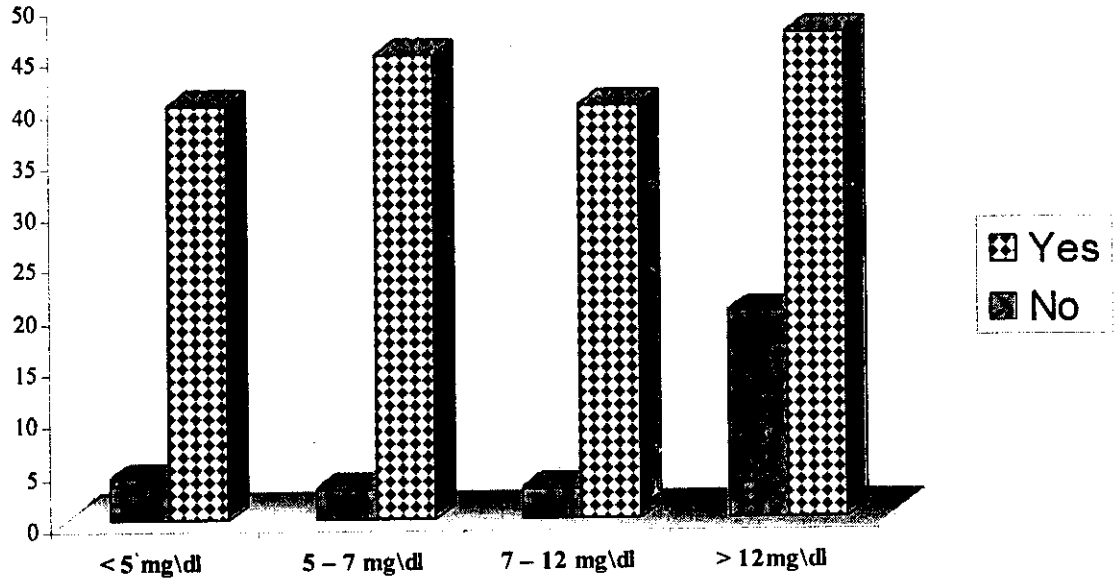


From table 7 and figure 5, one can conclude that while two thirds of the infants lacking rooming in developed serum bilirubin levels > 12 mg/dl, only 27.3% of those subjected to proper rooming in reached such a high level. Rooming in 24 hours a day significantly decreased the peak serum bilirubin concentration (P-value = 0).

Table VII: Rooming In and Peak Bilirubin Level:

Peak Bilirubin Level		Yes	No
< 5 mg/dl		40	4
5 – 7 mg/dl		45	3
7 – 12 mg/dl		40	3
> 12 mg/dl		47	20
chi-square	X^2	17.99	
	P-value	0.00	

Fig V: Rooming In and Peak Bilirubin Level:



In table VIII and figure VI, one can conclude that early breastfeeding (within 2 hours after delivery) significantly decreases the risk of neonatal jaundice (serum bilirubin level > 7 mg/dl) when compared to late onset breastfeeding (P-value = 0).

Table VIII: Time of 1st Breastfeed and Peak Bilirubin Level:

Peak Bilirubin Level		< 2 h	2 – 6 h	6 – 24 h
< 5 mg/dl		37	8	1
5 – 7 mg/dl		31	13	1
7 – 12 mg/dl		19	19	4
> 12 mg/dl		26	33	9
chi-square	X^2	26.48		
	P-value	0.00		

Fig VI: Time of 1st Breastfeed and Peak Bilirubin Level.

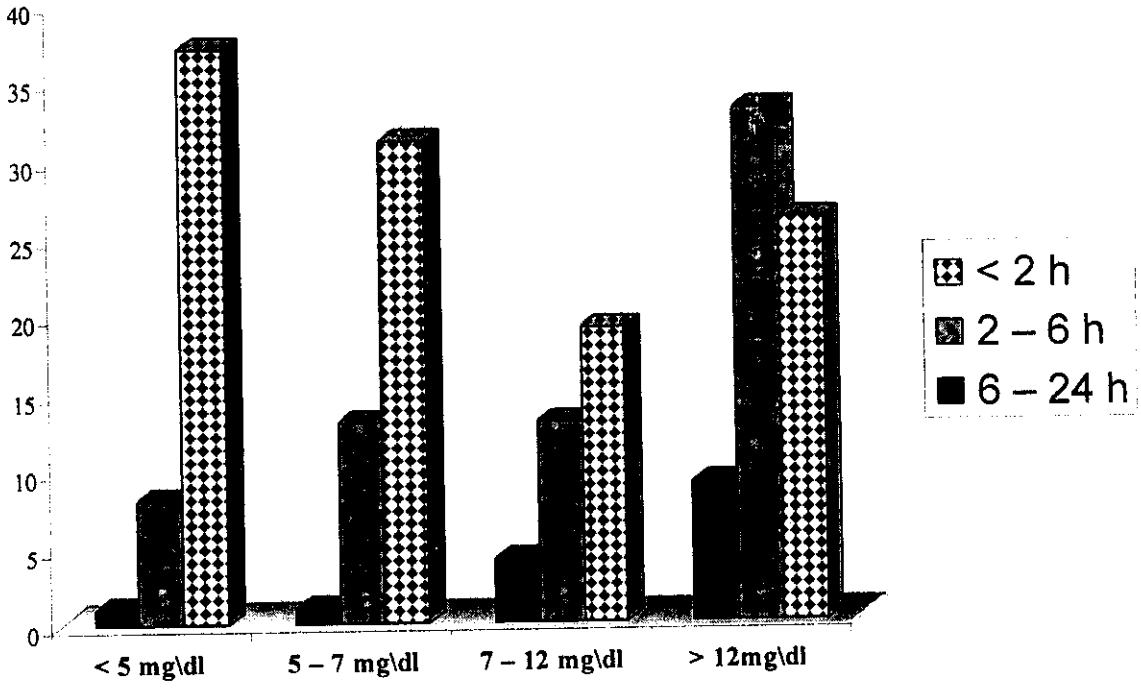
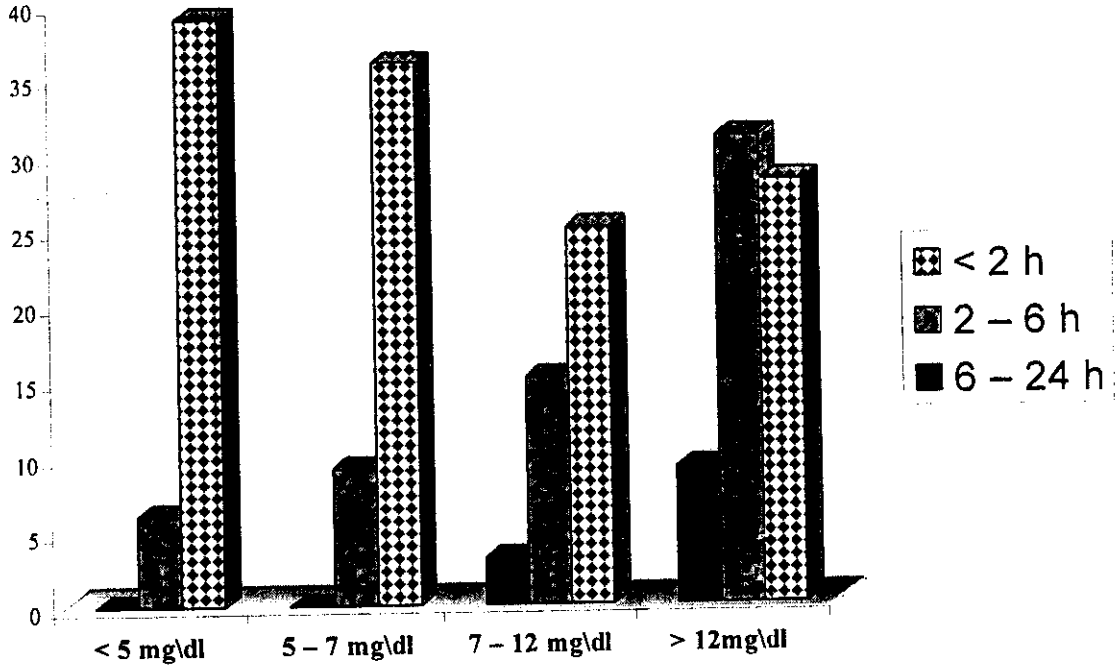


Table IX and figure VII show the relation between time of 1st skin contact & eye contact and peak bilirubin level. In our newborns early skin to skin contact and eye to eye contact occur almost at the same time. Late skin and eye contact proved to significantly increase the severity of neonatal jaundice (P-value = 0).

Table IX: Time of 1st Skin & Eye Contact and Peak Bilirubin Level:

Peak Bilirubin Level		< 2 h	2 – 6 h	6 – 24 h
< 5 mg/dl		39	6	0
5 – 7 mg/dl		36	9	0
7 – 12 mg/dl		25	15	3
> 12 mg/dl		28	31	9
chi-square	X^2	34.056		
	P-value	0.00		

Fig VII: Time of 1st Skin & Eye Contact and Peak Bilirubin Level:

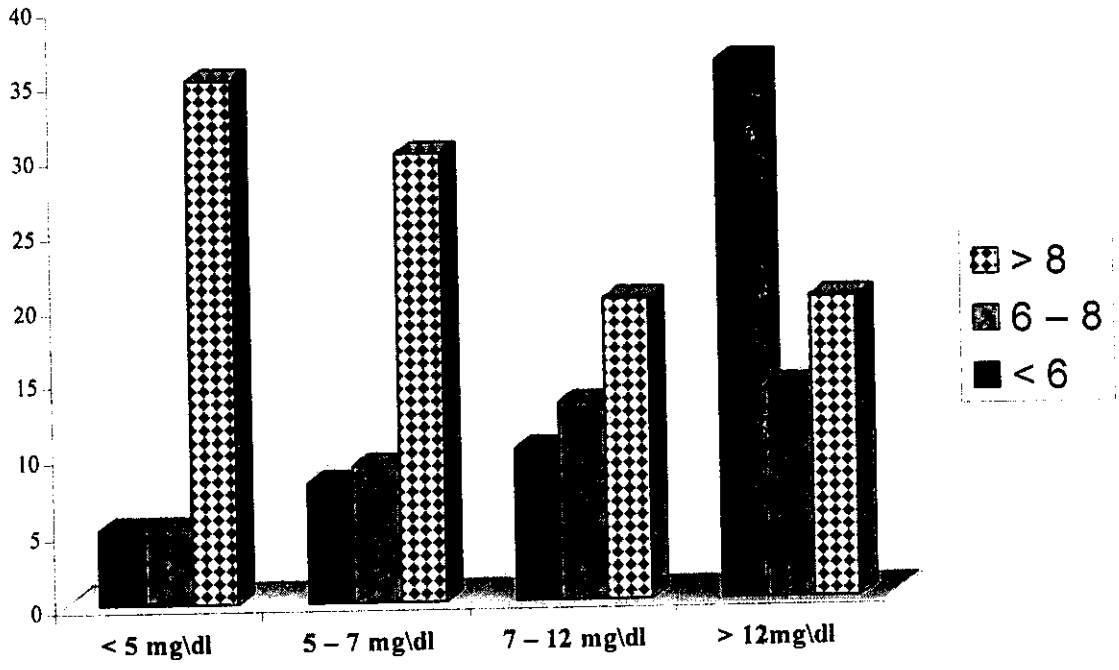


In table X and figure VIII, it is clear that frequency of feeding significantly affects the peak bilirubin level (P-vale = 0); the higher the frequency of feeding, the lower the risk of neonatal jaundice.

Table X: Frequency of Feeding and Peak Bilirubin Level:

Peak Bilirubin Level		> 8	6 – 8	< 6
< 5 mg / dl		35	5	5
5 – 7 mg / dl		30	9	8
7 – 12 mg / dl		20	13	10
> 12 mg / dl		20	14	36
chi-square	X^2	38.970		
	P-value	0.00		

Fig VIII: Frequency of Feeding and Peak Bilirubin Level:



In table XI and figure IX, it is quite evident that administration of prelacteals significantly increases the peak serum bilirubin level (P-vale = 0.001. More jaundiced newborns were noticed among those given prelacteals when compared with those not given these fluids.

Table XI: Prelacteals and Peak Bilirubin Level:

Peak Bilirubin Level		Yes	No
< 5 mg / dl		15	30
5 – 7 mg / dl		17	28
7 – 12 mg / dl		22	20
> 12 mg / dl		46	22
chi-square	X^2	16.255	
	P-value	0.001	

Fig IX: Prelacteals and Peak Bilirubin Level:

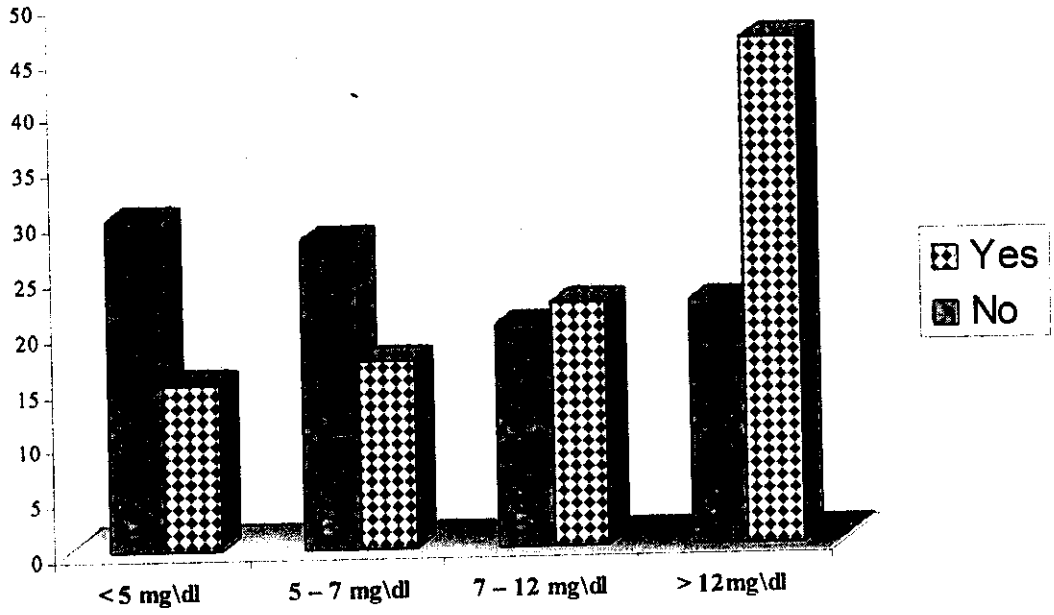


Table XII and figure X show the relation between bottle feeding and peak bilirubin level. Bottle feeding appears to be accompanied by a lower incidence of neonatal jaundice (P-value = 0.035).

Table XII: Bottle Feeding and Peak Bilirubin Level:

Peak Bilirubin Level		Yes	No
< 5 mg / dl		14	31
5 – 7 mg / dl		9	36
7 – 12 mg / dl		17	25
> 12 mg / dl		31	37
chi-square	X^2	8.577	
	P-value	0.035	

Fig X: Bottle Feeding and Peak Bilirubin Level:

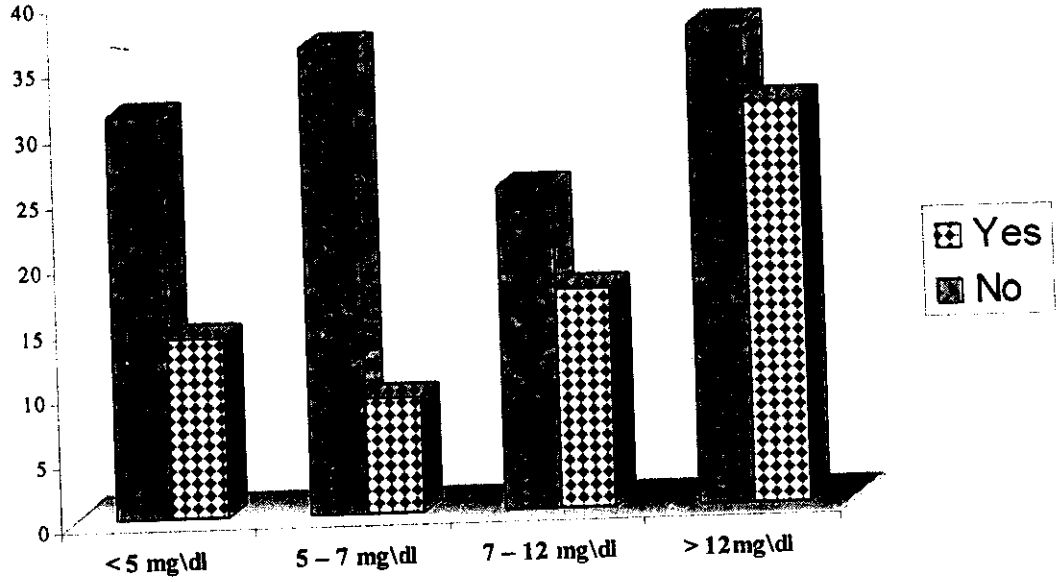


Table XIII and figure XI represent the relation between nutritional supplements administration and peak serum bilirubin level. Giving supplements increases the number of jaundiced newborns.

Table XIII: Supplements and Peak Bilirubin Level:

Peak Bilirubin Level		Yes	No
< 5 mg / dl		9	36
5 – 7 mg / dl		15	31
7 – 12 mg / dl		16	26
> 12 mg / dl		24	44
chi-square	X^2	4.050	
	P-value	0.256	

Fig XI: Supplements and Peak Bilirubin Level:

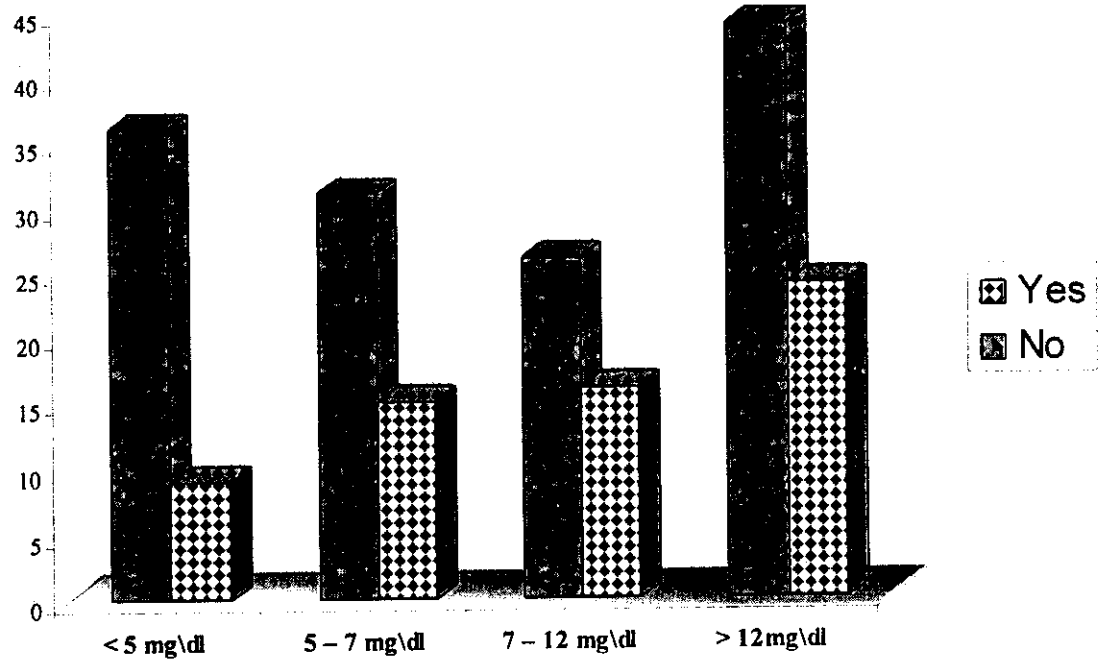


Table XIV and figure XII show the relation between using pacifiers and peak bilirubin level. Pacifiers increase the number of jaundiced newborns.

Table XIV: Pacifiers and Peak Bilirubin Level:

Peak Bilirubin Level		Yes	No
< 5 mg / dl		13	32
5 – 7 mg / dl		13	32
7 – 12 mg / dl		17	25
> 12 mg / dl		31	37
chi-square	X^2	4.910	
	P-value	0.179	

Fig XII: Pacifiers and Peak Bilirubin Level:

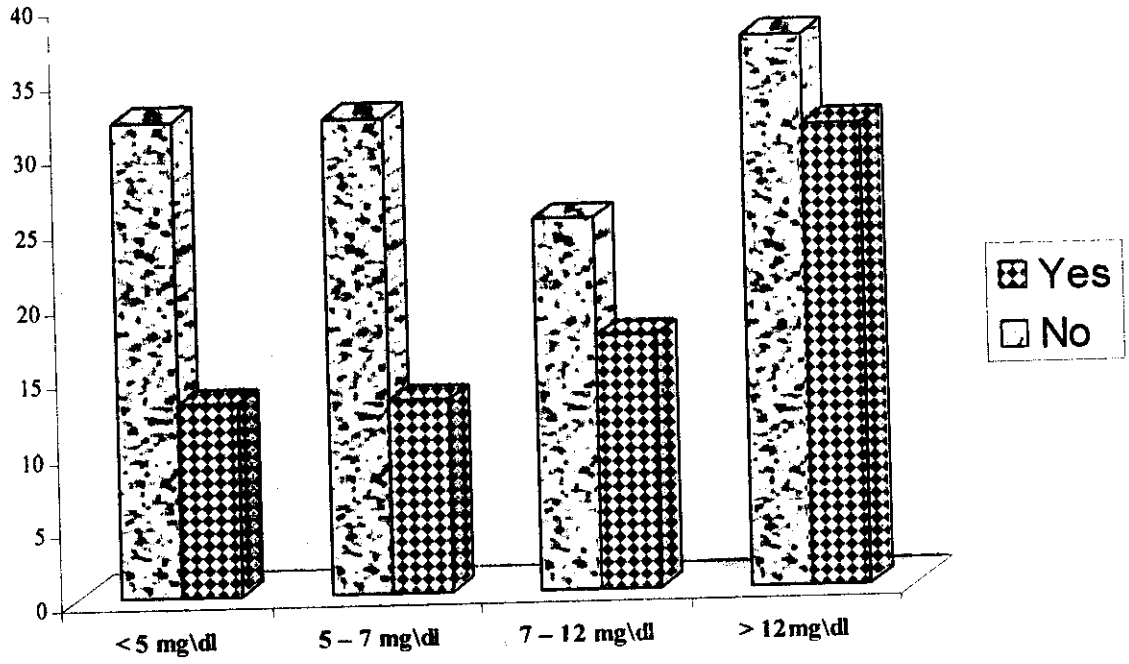


Fig XIII: Follow up of Feeding practices and Peak Bilirubin Level:

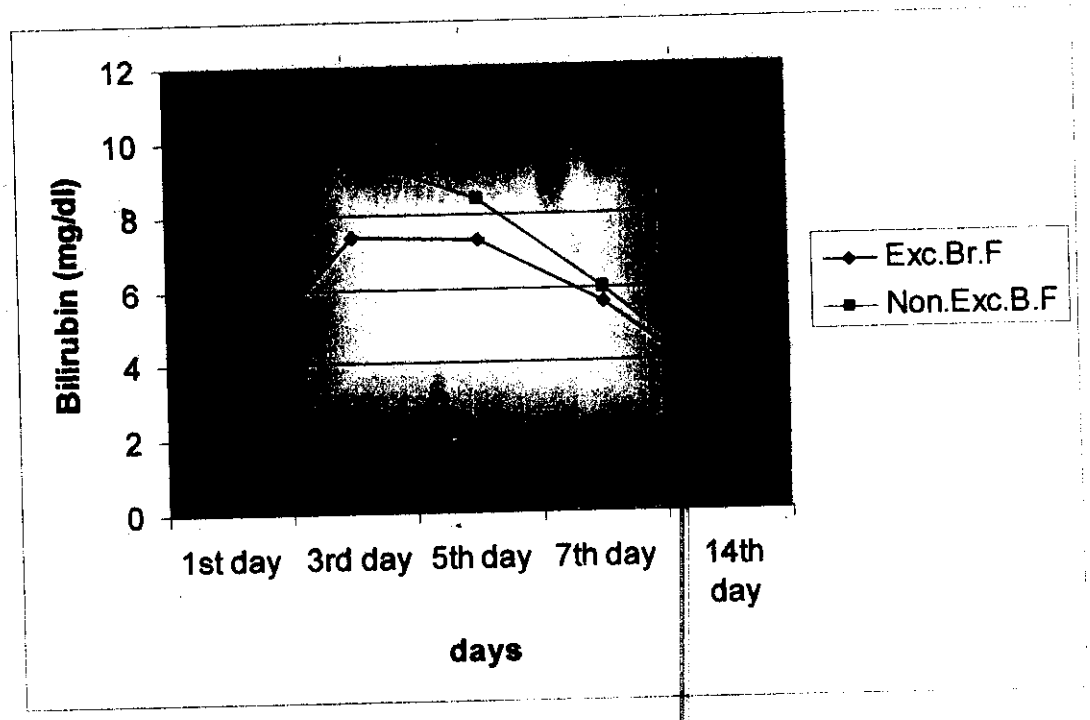


Figure XIII shows the relation between feeding practices and serum bilirubin levels. We can see that the non-exclusively breastfed infants develop serum bilirubin levels higher than those of the exclusively breastfed neonates.

Fig XIII: Follow up of mode of delivery and Peak Bilirubin Level:

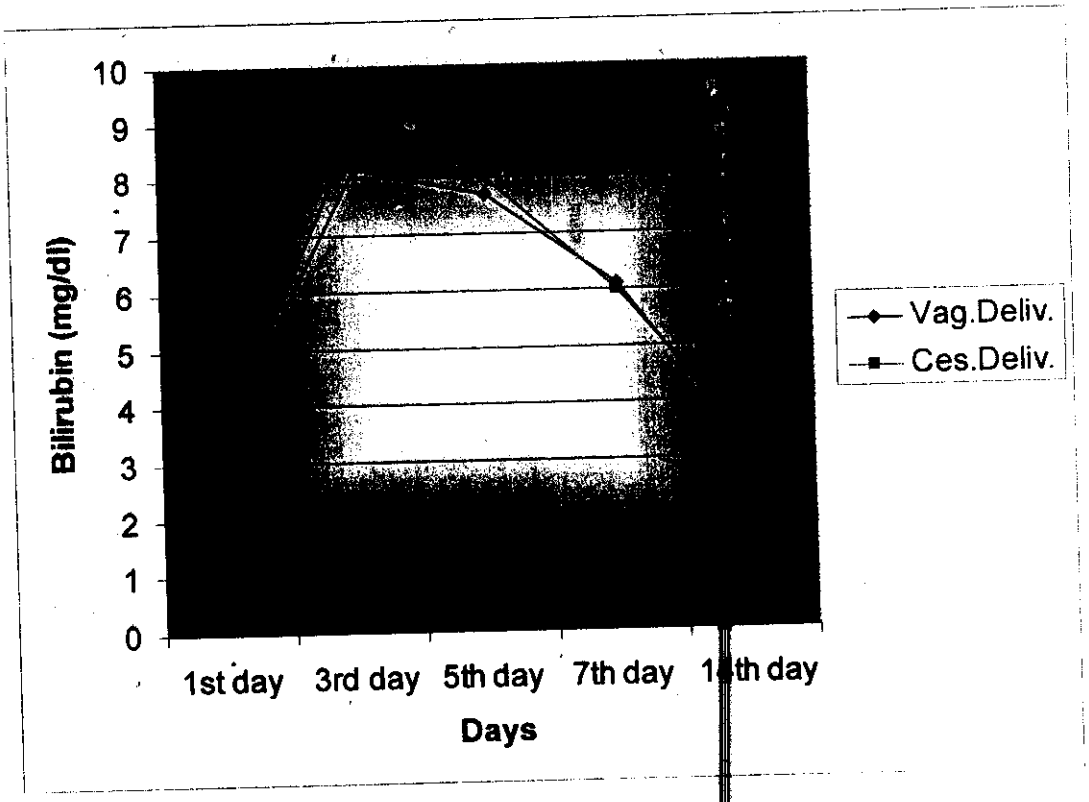


Figure XIV shows the follow up relation between the mode of delivery and peek serum bilirubin levels. It is clear that cesarean section is followed by peaks of serum bilirubin levels higher than those following normal vaginal delivery.