Results

Table (1): Distribution of the study groups according to sex.

Sex / St. group	Males		Females		Total	
	No	%	No	%	No	%
GI	71	45.8	84	54.2	155	100.0
GII	17	56.7	13	43.3	30	100.0
GIII	9	60.0	6	40.0	15	100.0
Total	97	48.5	103	51.5	200	100.0

$X^2 = 2.5$ $p > 0.05$

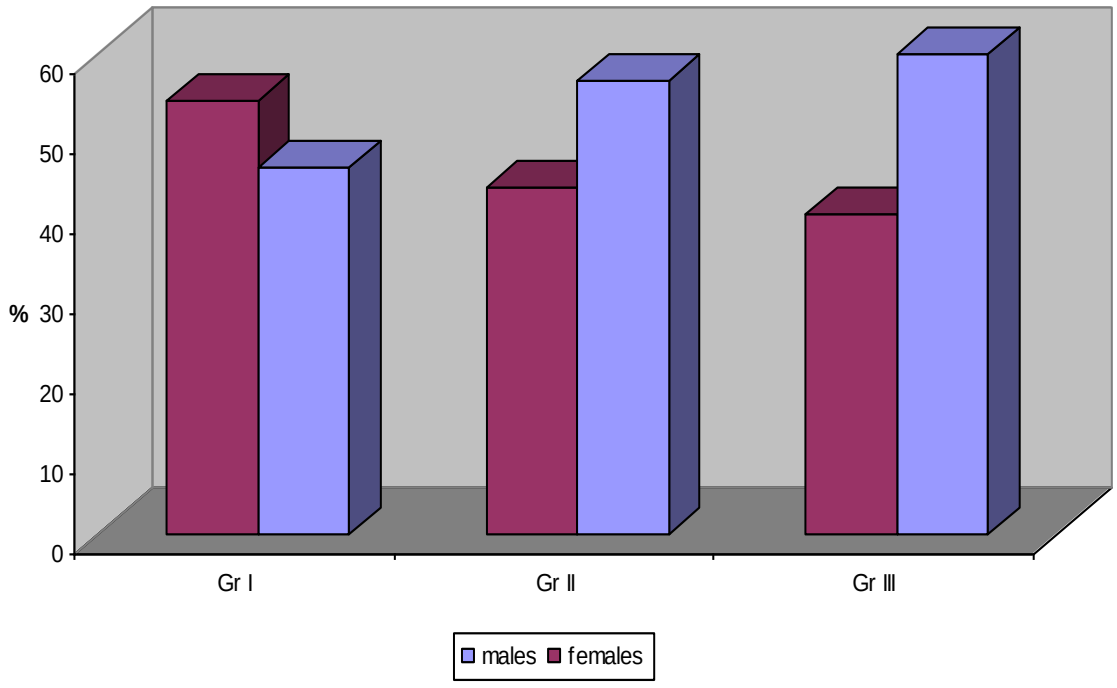

Figure (1): Distribution of the study groups according to sex.

Table (1) & figure (1) show study group according to sex.

No significant difference between the three groups as regarding ratio of male to female.

Table (2): Means ± SD of birth weight (kg) of the study groups.

WT (kg) / St. group	X ± SD	t test	p
GI n = 155	3.08 ± 0.43	t_1 = 16.8	< 0.001
GII n = 30	2.04 ± 0.28	t_2 = 11.01	< 0.001
GIII n = 15	1.88 ± 0.4	t_3 = 1.37	> 0.05
	F = 126.22	P < 0.001	

t_1 = I VS II t_2 = I VS III t_3 = II VS III

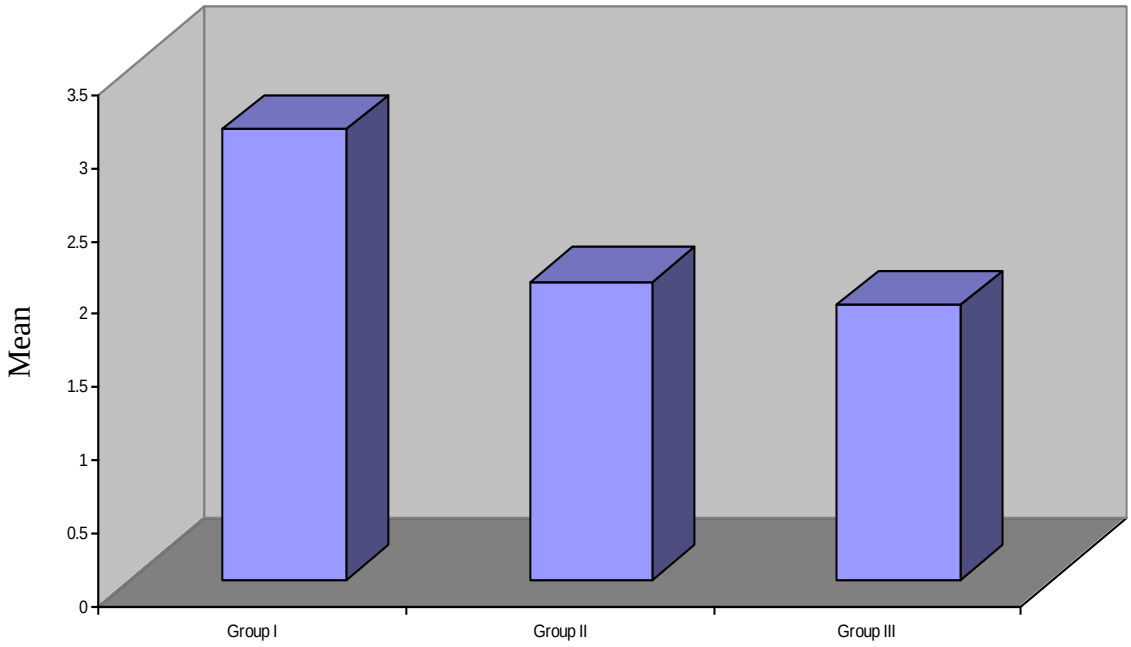

Figure (2): Means of birth weight (kg) among study groups.

Table (2) & figure (2) showed a significant difference between GI, GII & GI, GIII (p value < 0.001) but no significant difference between GII, GIII regarding birth weight (p > 0.05).

Table (3): Means ± SD of umbilical cord serum bilirubin levels (mg/dL) in the study groups.

c. bilirubin (mg/dL) / St. group	X ± SD	t	p
GI	2.29 ± 0.9	$t_1 = 0.12$	> 0.05
GII	2.21 ± 0.665	$t_2 = 0.75$	> 0.05
GIII	1.79 ± 0.8	$t_3 = 1.76$	> 0.05
	F = 0.04	P > 0.05	

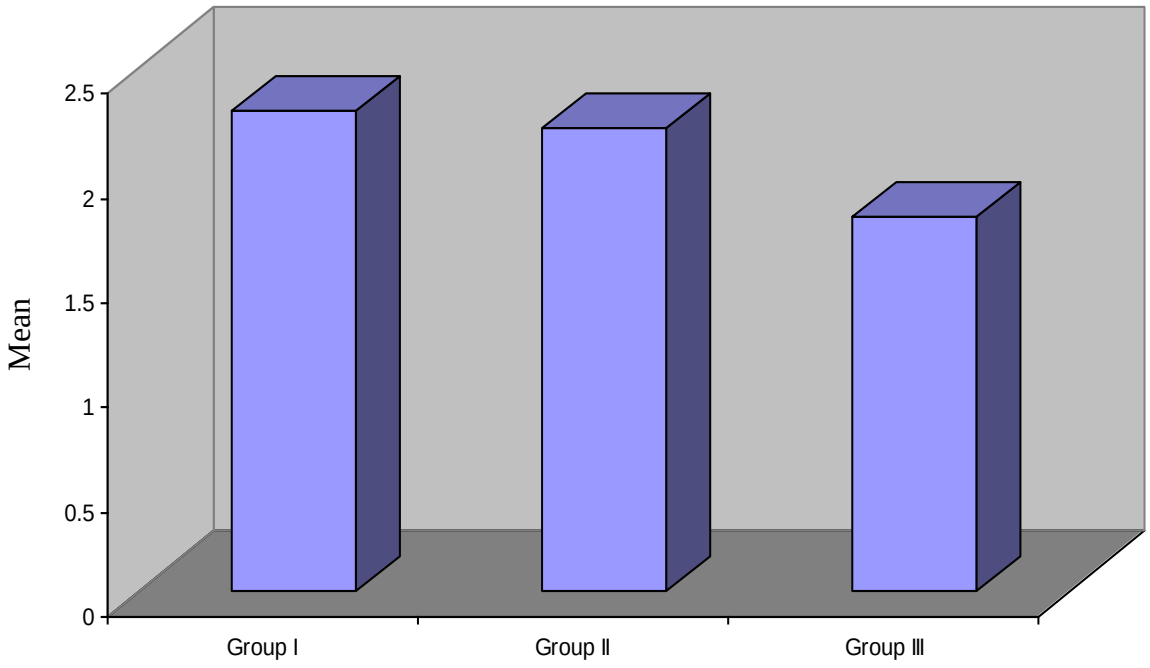

Figure (3): Means of umbilical cord serum bilirubin levels (mg/dL) among the study groups.

Table (3) & figure (3) showed no significant differences between the three groups regarding serum bilirubin levels in the cord blood samples.

Table (4): Means ± SD of 4th day serum bilirubin levels (mg/dL) in the study groups.

4th day bilirubin (mg/dL) / St. group	X ± SD	t	p
I	13.52 ± 5.93	t_1 = 5.46	< 0.001
II	18.61 ± 4.39	t_2 = 1.25	> 0.05
III	15.1 ± 4.52	t_3 = 2.48	< 0.05
	F = 10.34	P < 0.1	

t_1 = I VS II t_2 = I VS III t_3 = II VS III

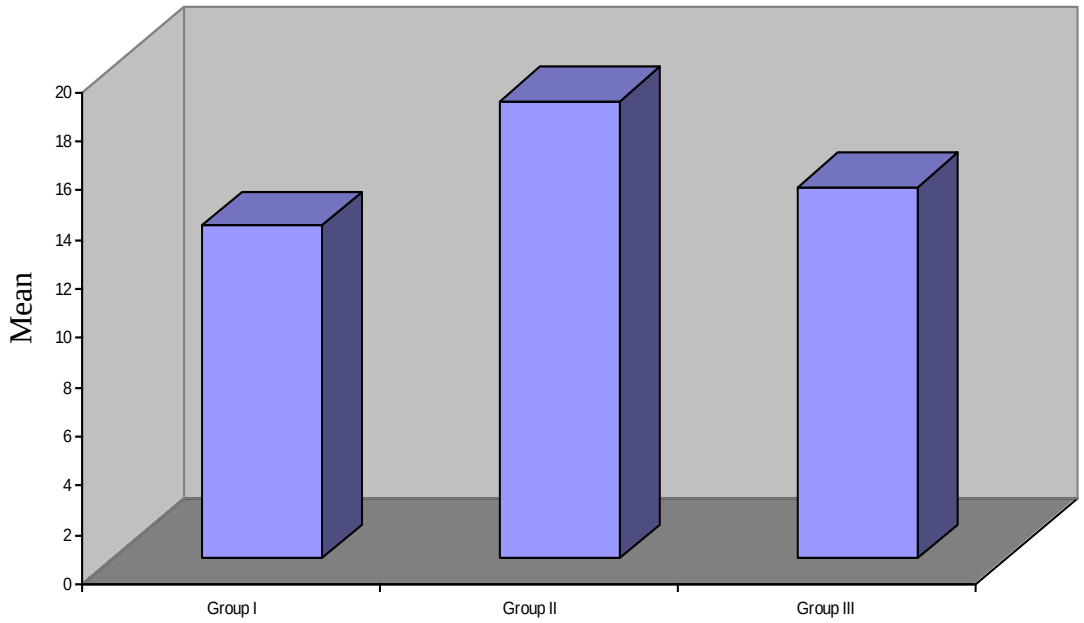

Figure (4): Means of 4th day serum bilirubin (mg/dL) among the study groups.

Regarding the 4th day serum bilirubin levels GII showed higher significant differences than GI ($p < 0.001$) and GIII ($p < 0.05$) . However, no significant difference between GI and GIII ($p > 0.05$) was found.

When all groups are compared together there was a significant difference between three groups.

Table (5): Means ± SD of jaundice meter reading lower limb among the study groups.

J. meter LL / St. group	X ± SD	t	p
GI	13.07 ± 4.23	t_1 = 3.47	< 0.001
GII	16.21 ± 4.59	t_2 = 0.92	> 0.05
GIII	11.65 ± 5.84	t_3 = 2.64	< 0.05
	F = 8.43	P < 0.001	

t_1 = I VS II t_2 = I VS III t_3 = II VS III

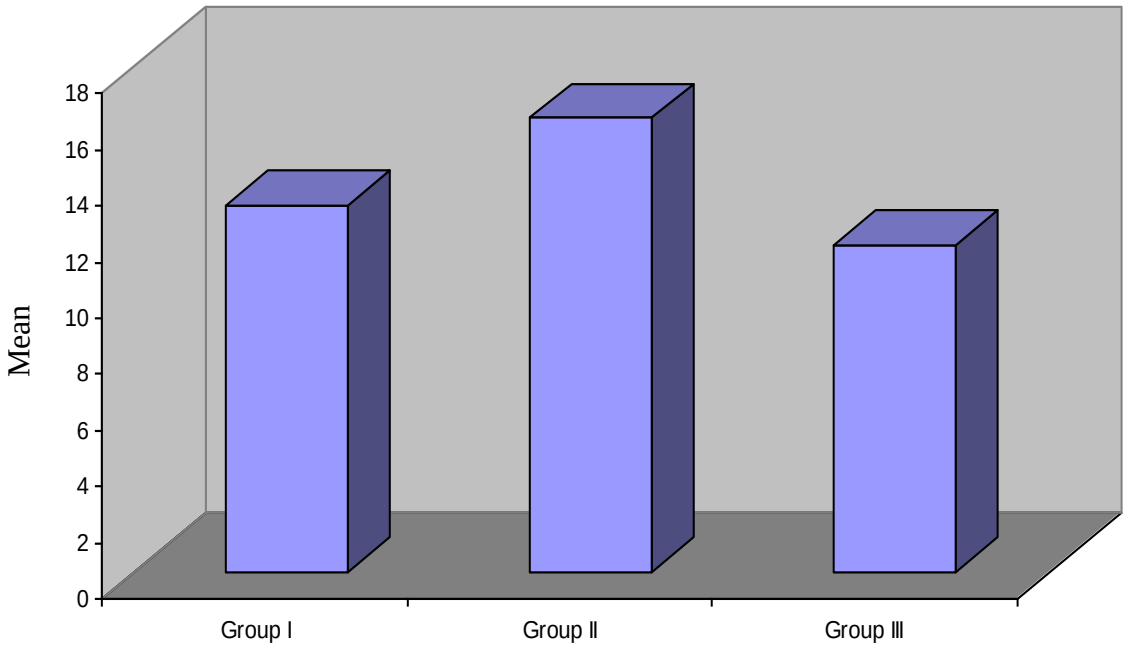

Figure (5): Means of jaundice meter reading lower limb among the study groups.

Table (5) & figure (5) showed means of jaundice meter reading of lower limb there are significant difference between GI and GII ($p < 0.001$), significant difference between GII and GIII ($p < 0.05$) but no significant difference between GI and GIII ($p > 0.05$). the ANOVA test showed high significant difference in mean values of the three groups.

Table (6): Means ± SD of jaundice meter reading of the head among the study groups.

J. meter head / St. group	X ± SD	t	p
I (n = 155)	15.96 ± 4.94	t_1 = 14.9	< 0.001
II (n = 30)	28.08 ± 4.18	t_2 = 0.37	> 0.05
III (n = 15)	16.4 ± 4.29	t_3 = 8.68	> 0.05
	F = 6.05	P < 0.05	

t_1 = I VS II t_2 = I VS III t_3 = II VS III

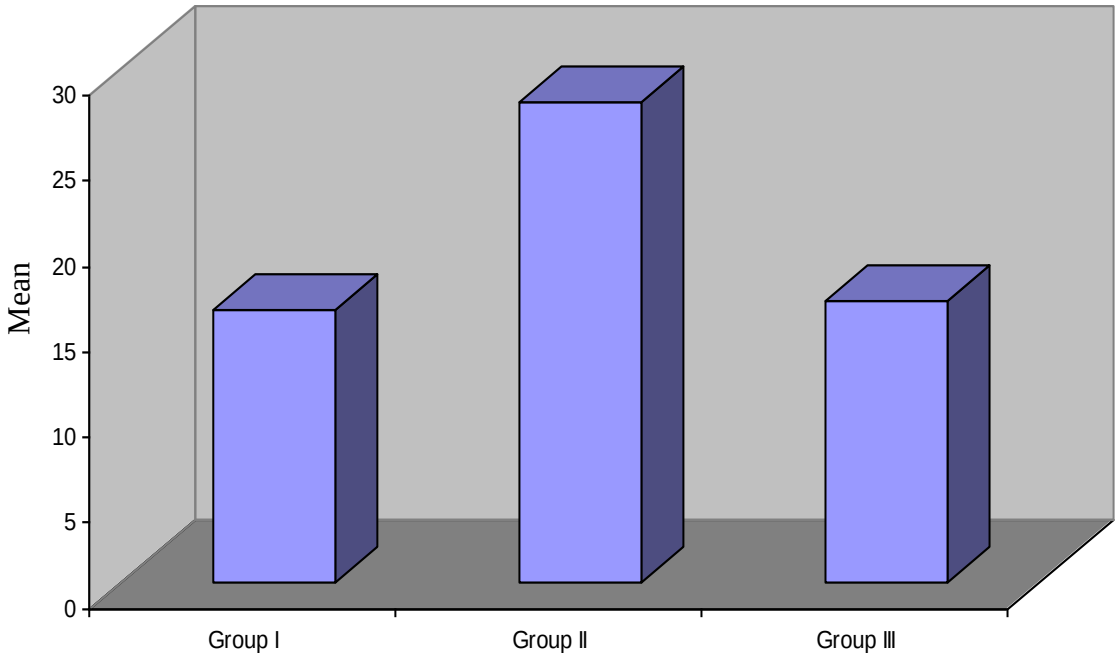

Figure (6): Means of jaundice meter head among the study groups.

Regarding mean reading of jaundice meter head, table (6) & figure (6) showed high significant difference between GII and GI (p value < 0.001), significant difference between GII and GIII (p value > 0.05) but no significant difference between GI and GIII.

Table (7): Means ± SD of jaundice meter chest among the study groups.

J. meter chest / St. group	X ± SD	t	p
GI	16.01 ± 5.19	t_1 = 5.17	< 0.001
GII	20.77 ± 4.49	t_2 = 0.48	> 0.05
GIII	16.71 ± 5.43	t_3 = 2.49	< 0.05
	F = 11.18	P < 0.001	

t_1 = I VS II t_2 = I VS III t_3 = II VS III

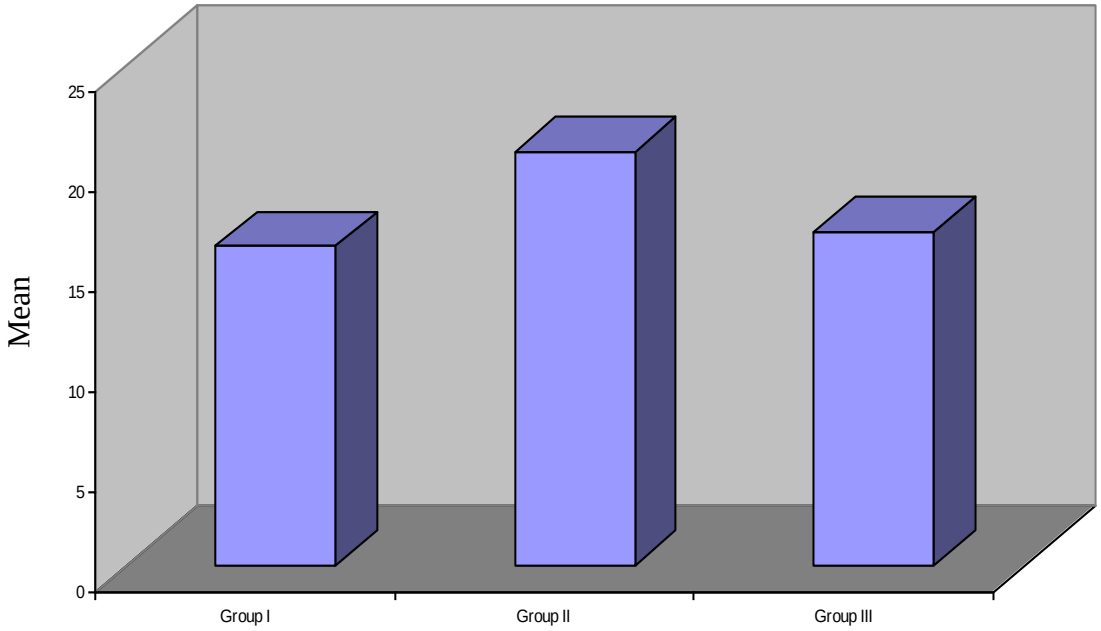

Figure (7): Means of jaundice meter reading of the chest among the study groups.

Table (7) & figure (7) showed the mean levels of jaundice meter reading on chest of the three studied groups. There were a highly significant difference between GI and GII ($p < 0.001$) and a significant difference between GII and GIII ($p < 0.05$) but no significant difference between GI and GIII ($p > 0.05$).

Table (8): Means ± SD of different variables according to sex.

Sex / Variable	Males (n = 97) X ± SD	Females (n = 103) X ± SD	t	p
WT (kg)	2.8 ± 0.6	2.87 ± 0.6	0.83	> 0.05
Apgar score	8.04 ± 0.56	7.96 ± 0.52	1.01	> 0.05
Cord bilirubin (mg/dL)	1.73 ± 0.9	1.8 ± 0.9	0.19	> 0.05
4^{th} day bilirubin (mg/dL)	14.6 ± 6.01	14.2 ± 5.1	0.4	> 0.05
Jaundice meter head reading	19.11 ± 9.3	16.58 ± 8.96	1.95	> 0.05
Jaundice meter chest reading	16.75 ± 5.1	16.8 ± 5.5	0.08	> 0.05
Jaundice meter LL reading	13.64 ± 4.59	13.25 ± 4.2	0.63	> 0.05

This table showed that there were no significant differences between both sexes in the study groups as regarding body weight, APGAR score, cord blood bilirubin, 4^{th} day bilirubin, jaundice meter head, jaundice meter chest and jaundice meter lower limb.

Table (9): Means ± SD of serum bilirubin (mg/dL) according to gestational age.

GA / Variable	FT (n = 170) X ± SD	PT (n = 30) X ± SD	t	p
Cord bilirubin	1.66 ± 0.9	2.19 ± 0.7	3.76	< 0.001
4th day bilirubin	13.65 ± 5.8	18.7 ± 4.4	5.46	< 0.001
j. head	15.99 ± 4.87	28.12 ± 4.2	14.22	< 0.001
j. chest	16.05 ± 5.08	20.9 ± 4.6	5.25	< 0.001
j. LL	12.96 ± 4.25	16.14 ± 4.05	3.94	< 0.001

FT = full term PT = preterm

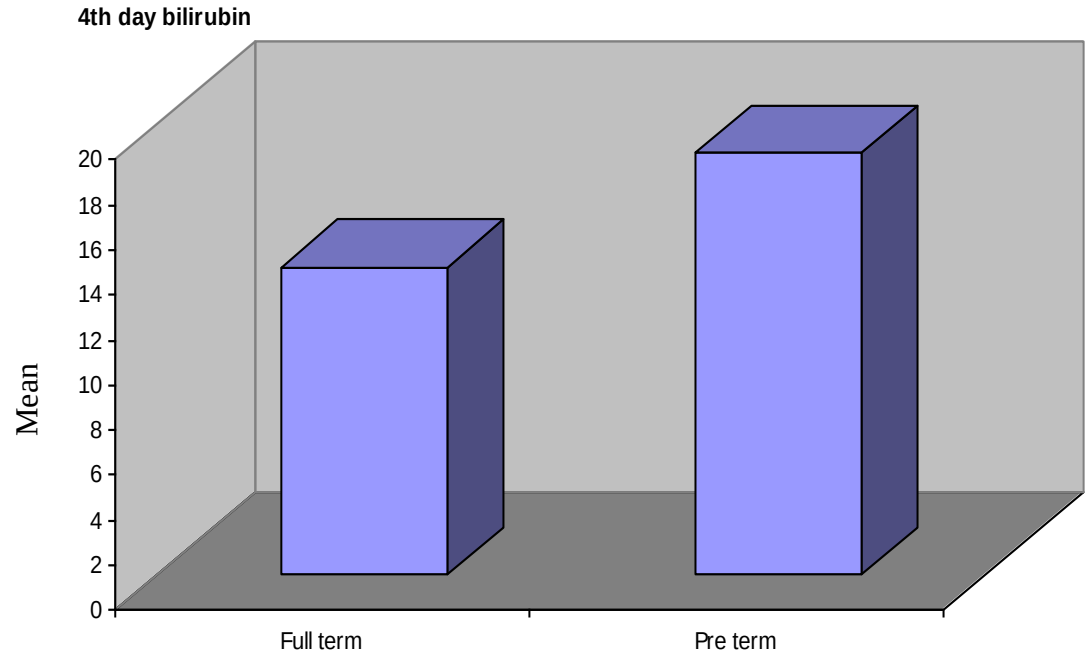

Figure (8): Means of 4th day serum bilirubin (mg/dL) according to gestational age.

Table (9) & figure (8) showed a significant difference between full term and preterm newborns regarding cord blood serum bilirubin , 4th day bilirubin levels, jaundice meter readings head, chest and lower limb ($p < 0.001$).

Table (10): Means ± SD of serum bilirubin levels of the newborns according to mode of delivery.

mode of delivery / Variable	VD n = 133 X ± SD	CS n = 67 X ± SD	t	p
Cord blood bilirubin	2.48 ± 8.5	1.75 ± 1.02	0.98	> 0.05
4th day serum bilirubin	14.6 ± 5.6	14.01 ± 6.07	0.65	> 0.05
Jaundice meter readings head	18.49 ± 7.8	16.46 ± 6.7	1.91	> 0.05
Jaundice meter readings chest	16.97 ± 5.46	16.39 ± 4.96	0.76	> 0.05
Jaundice meter readings LL	13.59 ± 4.5	13.14 ± 4.07	0.71	> 0.05

VD = vaginal delivery CS = cesarean section

This table showed that mode of delivery of the newborns whether if it was vaginal or cesarean section didn't affected levels of bilirubin ($p > 0.05$).

Table (11): Means ± SD of bilirubin levels among the study groups according to drug used during delivery.

Drug used / Variable	Oxytocin n = 26 X ± SD	No drug n = 174 X ± SD	t	P
Cord bilirubin	1.80 ± 0.8	1.74 ± 0.9	0.37	> 0.05
4th day bilirubin	15.11 ± 4.5	14.3 ± 6.1	0.81	> 0.05
Jaundice meter readings head	17.2 ± 4.3	17.9 ± 4.2	0.8	> 0.05
Jaundice meter readings chest	16.7 ± 3.4	16.6 ± 5.5	0.16	> 0.05
Jaundice meter readings LL	13.24 ± 3.7	13.47 ± 4.5	0.29	> 0.05

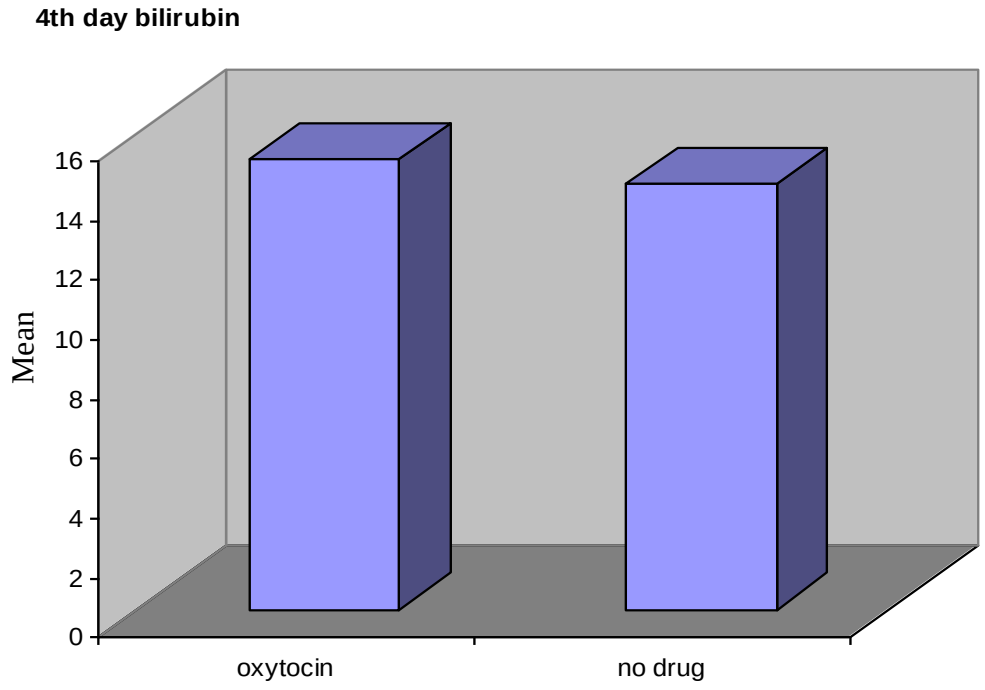

Figure (9): Means of 4th day bilirubin (mg/dL) according to drug used.

Table (11) & figure (9) showed that there was no significant difference between both groups.

Table (12): X ± SD of APGAR score among the study groups.

APGAR score / St. group	X ± SD	t	p
I	7.95 ± 0.54	$t_1 = 1.18$	> 0.05
II	8.07 ± 0.5	$t_2 = 1.74$	> 0.05
III	8.37 ± 0.92	$t_3 = 1.85$	> 0.05
	F = 4.61	P < 0.05	

t_1 = I VS II t_2 = I VS III t_3 = II VS III

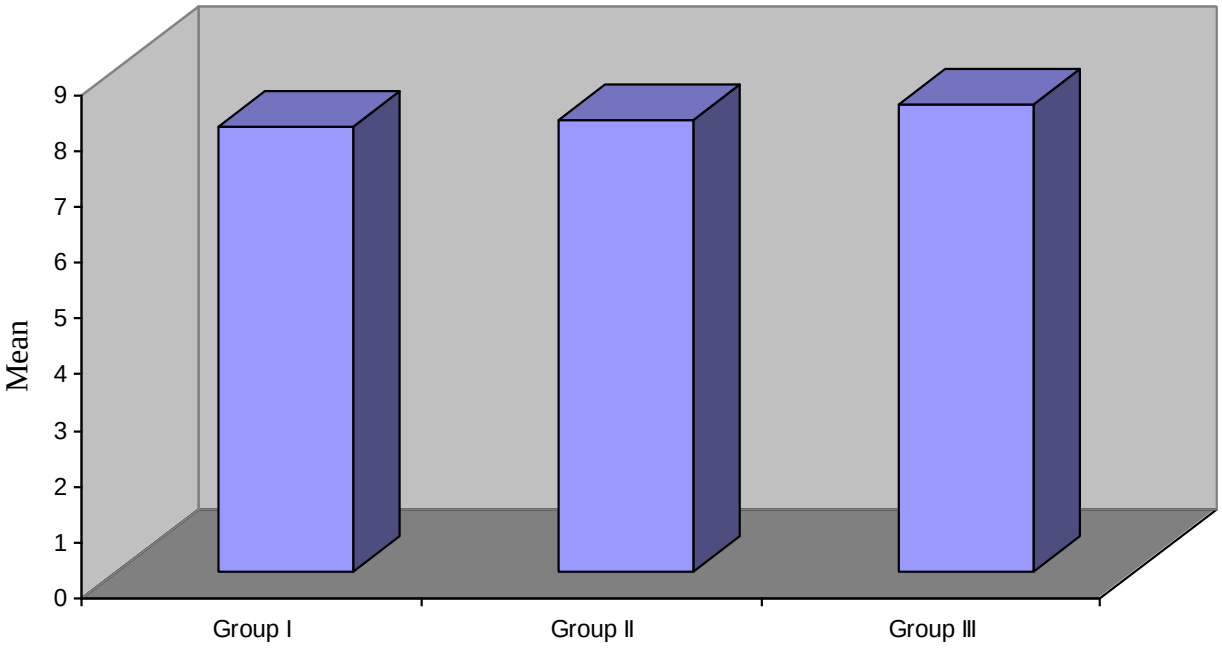

Figure (10): Means of APGAR score among the study groups.

Table (12) & figure (10) there was no significant difference between study groups (p value > 0.05).

Table (13): Correlation coefficient "r" between birth weight of neonates (kg) and bilirubin levels (mg/dL).

WT (kg) / Variable	"r"	p
Umbilical cord serum bilirubin	- 0.1257	> 0.05
4th day serum bilirubin	- 0.2103	< 0.05
Jaundice meter readings head	- 0.229	< 0.05
Jaundice meter readings chest	- 0.1982	< 0.05
Jaundice meter readings LL	- 0.2296	< 0.05

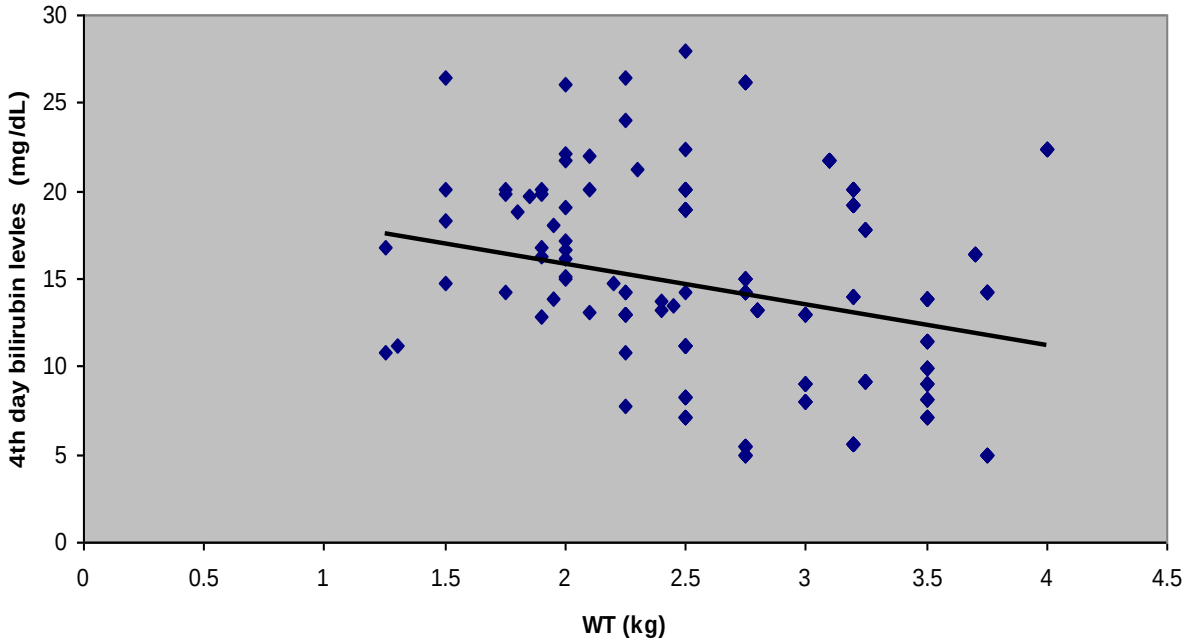

Figure (11a): shows a significant negative correlation between serum bilirubin level on the 4th day and birth weight of the newborns.

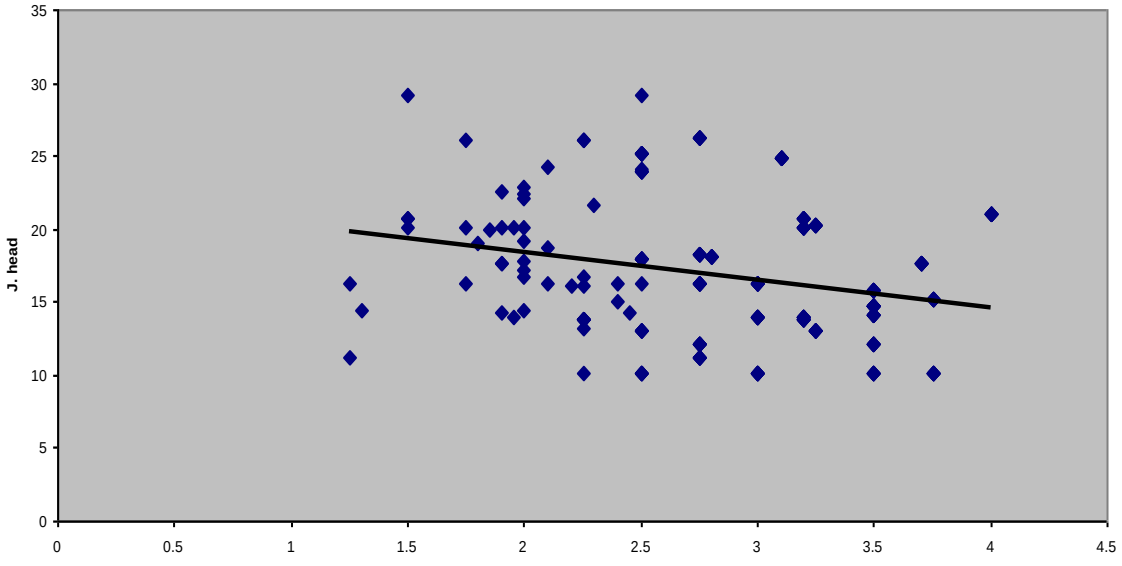

Figure (11b): Correlation coefficient between weight (kg) and j. head.

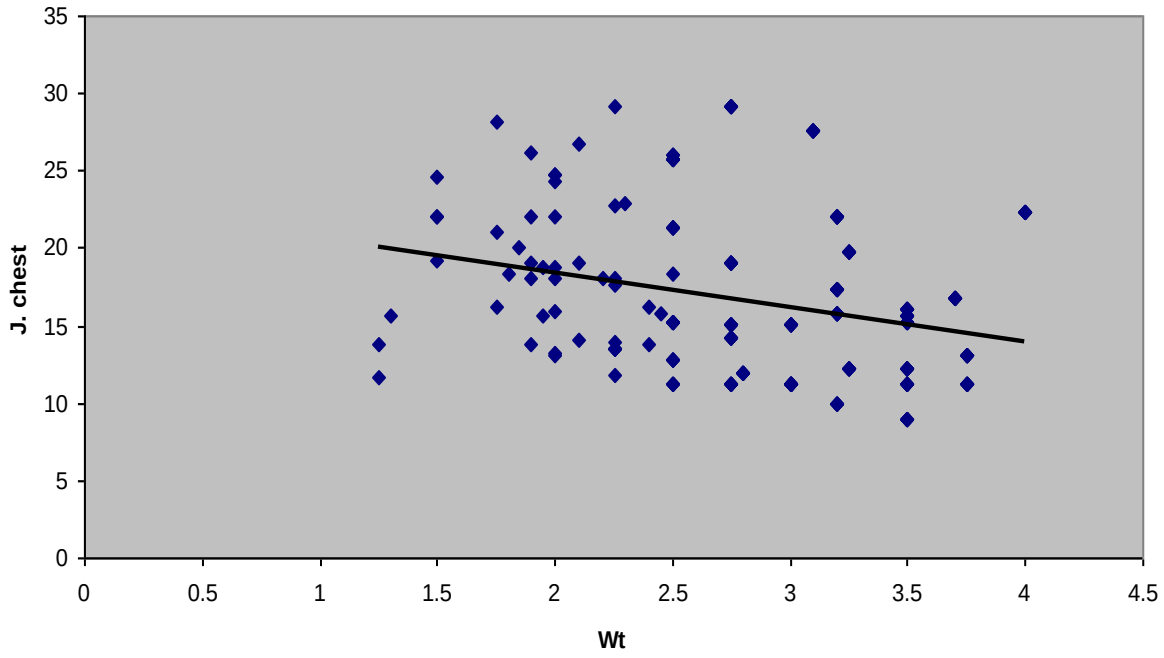

Figure (11c): Correlation coefficient between weight (kg) and j. chest reading.

Table (13) & figure (11a, 11b, 11c) showed that there were significant negative correlations between birth weight and 4th day serum bilirubin, j. head, j. chest and lower limb reading but no significant correlation between weight and cord blood bilirubin.

Table (14): Correlation coefficient "r" between umbilical cord serum and 4th day serum bilirubin (mg/dL).

u. cord bilirubin (mg/dL) / Variable	"r"	p
GI	0.799	< 0.001
GII	0.858	< 0.001
GIII	0.9541	< 0.001

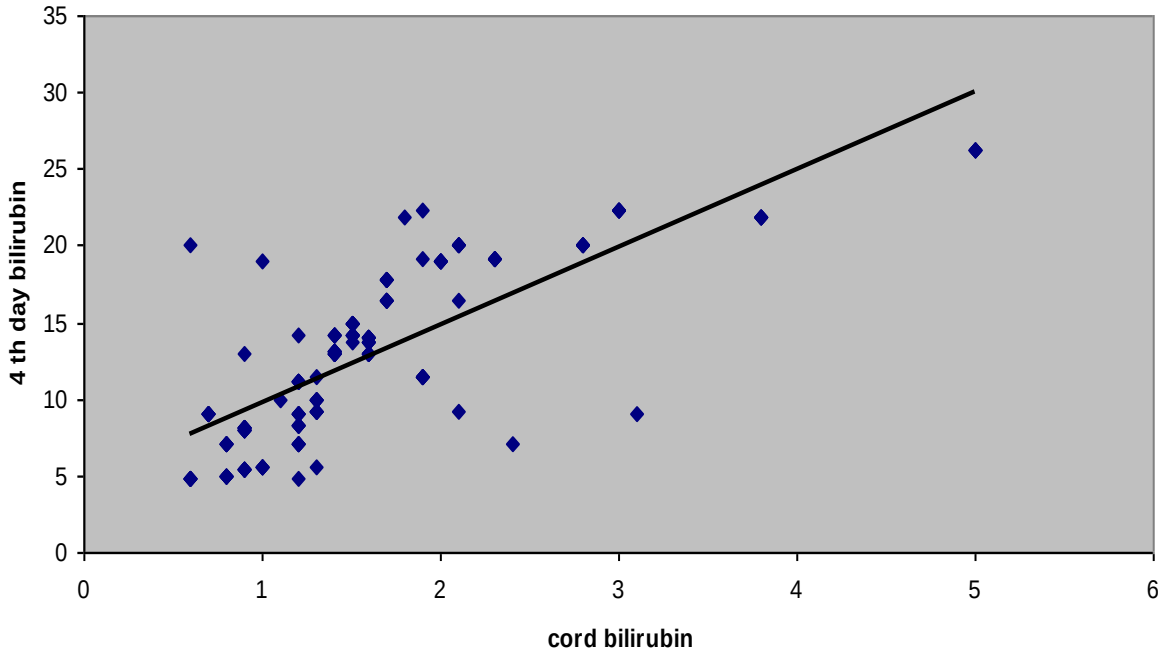

Figure (12a): Correlation coefficient between umbilical cord serum bilirubin (UCS) and 4th day serum bilirubin among group I.

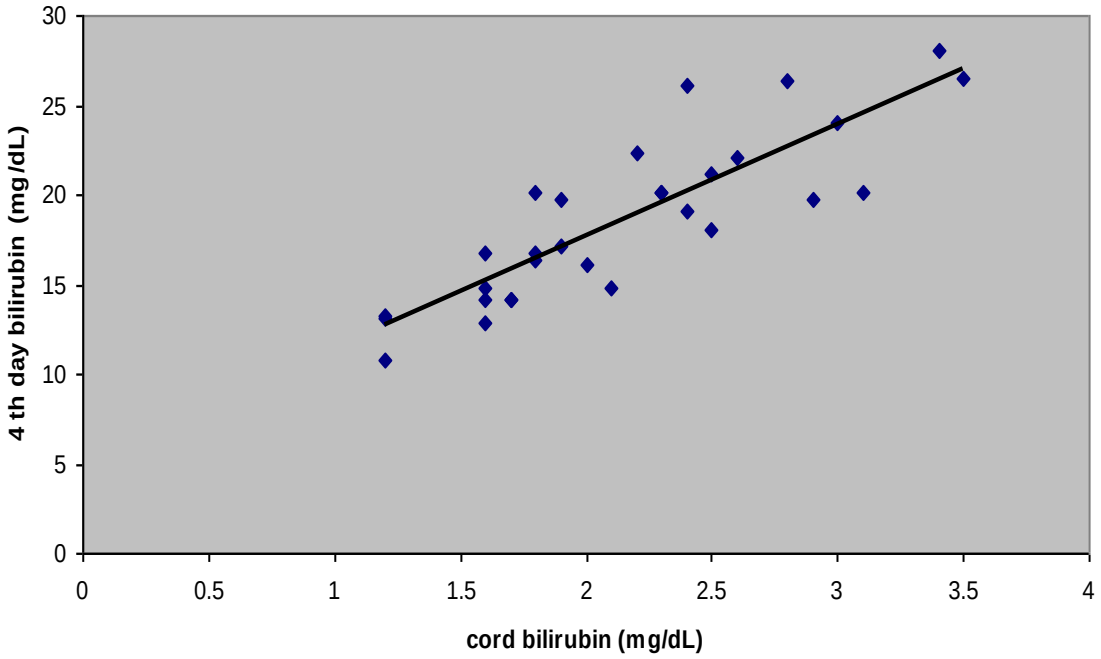

Figure (12b): Correlation coefficient between umbilical cord serum bilirubin (UCS) and 4th day serum bilirubin among group II.

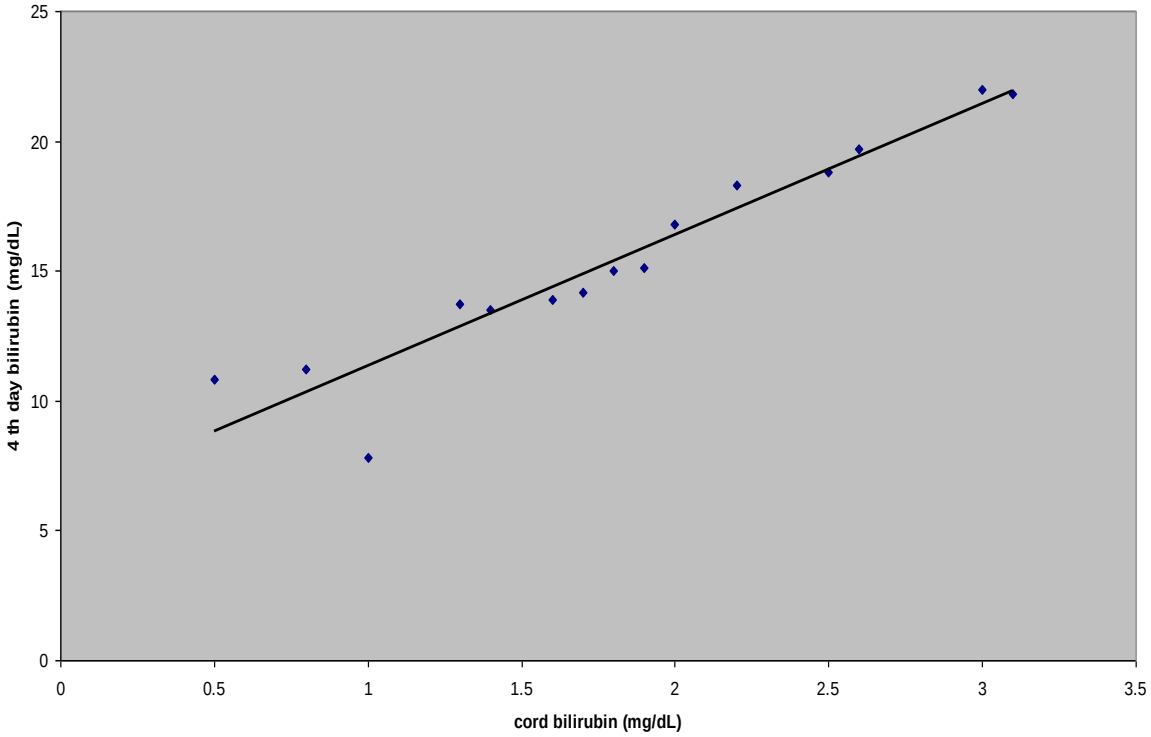

Figure (12c): Correlation coefficient between umbilical cord serum bilirubin (UCS) and 4th day serum bilirubin among group III.

Table (14) & figure (12a, 12b, 12c) showed that there were significant +ve correlations between cord serum bilirubin and 4th day serum bilirubin in the different study groups ($p < 0.001$).

Table (15): Correlation coefficient between 4th day serum bilirubin (mg/dL) and different variables.

4th day / different parameter	"r"	P
Weight (kg)	- 0.2103	< 0.05
Jaundice meter readings head	0.3689	< 0.01
Jaundice meter readings chest	0.8707	< 0.001
Jaundice meter readings LL	0.8193	< 0.001
APG	- 0.0751	> 0.05

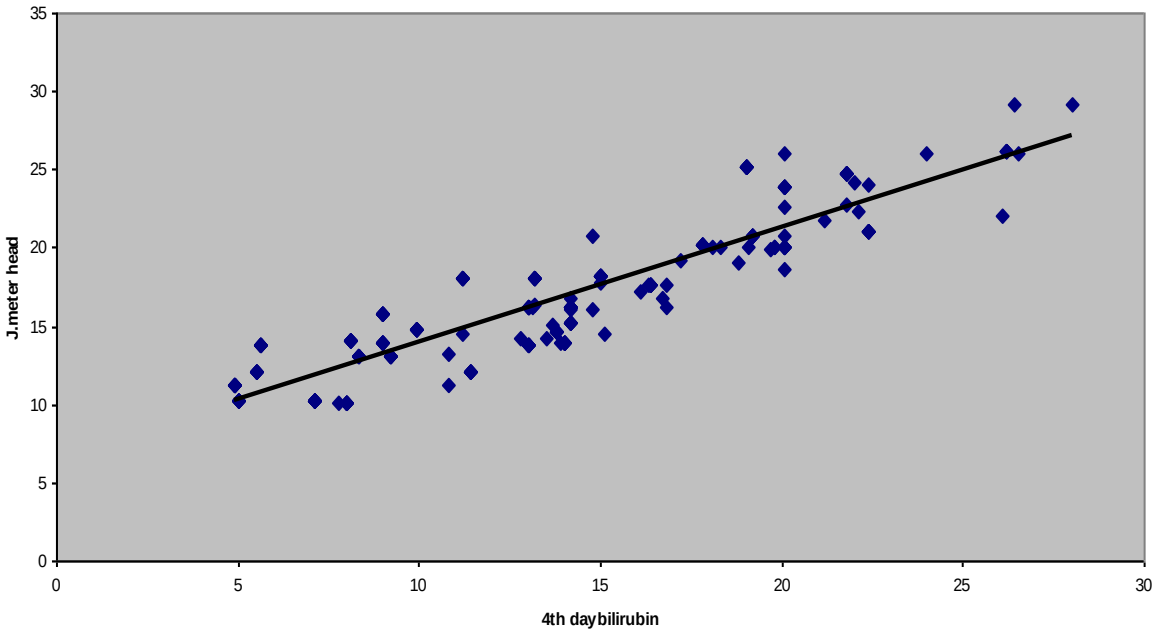

Figure (13a): Correlation coefficient between 4th day serum bilirubin and j. meter head.

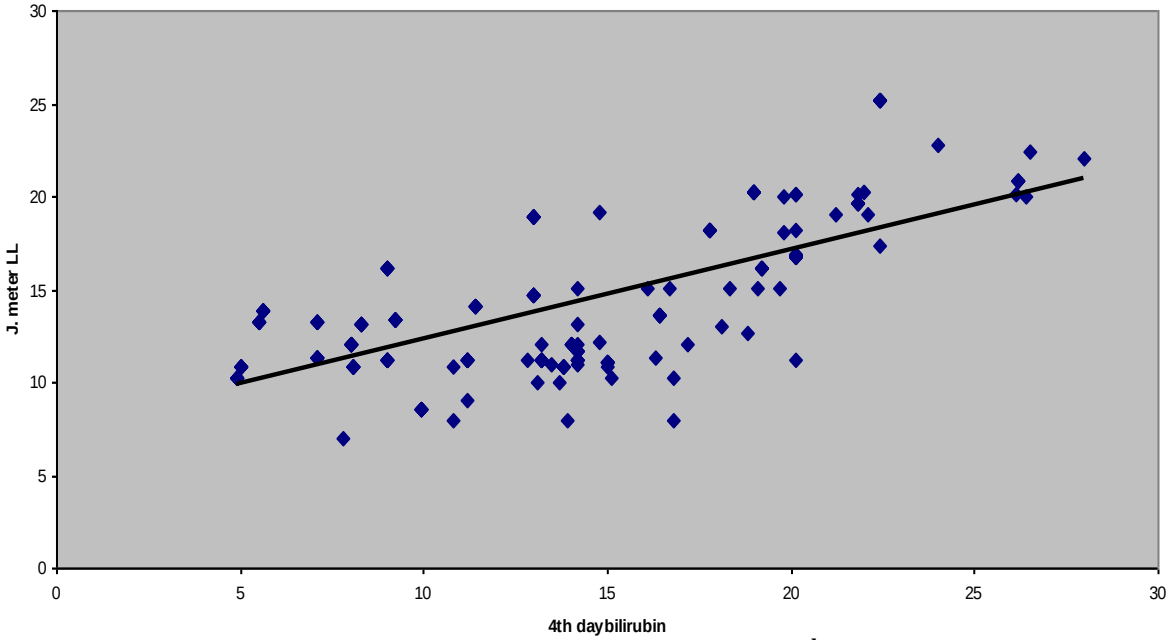

Figure (13b): Correlation coefficient between 4th day serum bilirubin and j. meter LL.

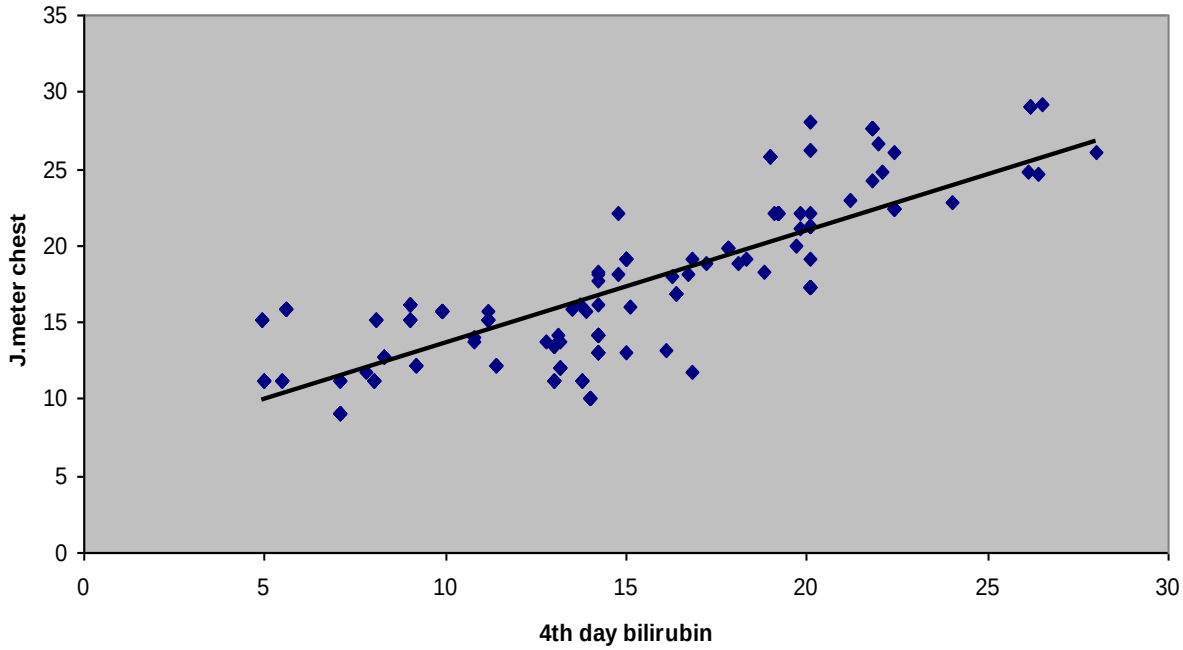

Figure (13c): Correlation coefficient between 4th day serum bilirubin and j. meter chest.

Table (16) & figures (13a, 13b, 13c) this table showed there was a significant correlation between weight and 4th day bilirubin, j. head, j. chest and lower limb but no significant correlation between weight and cord bilirubin.

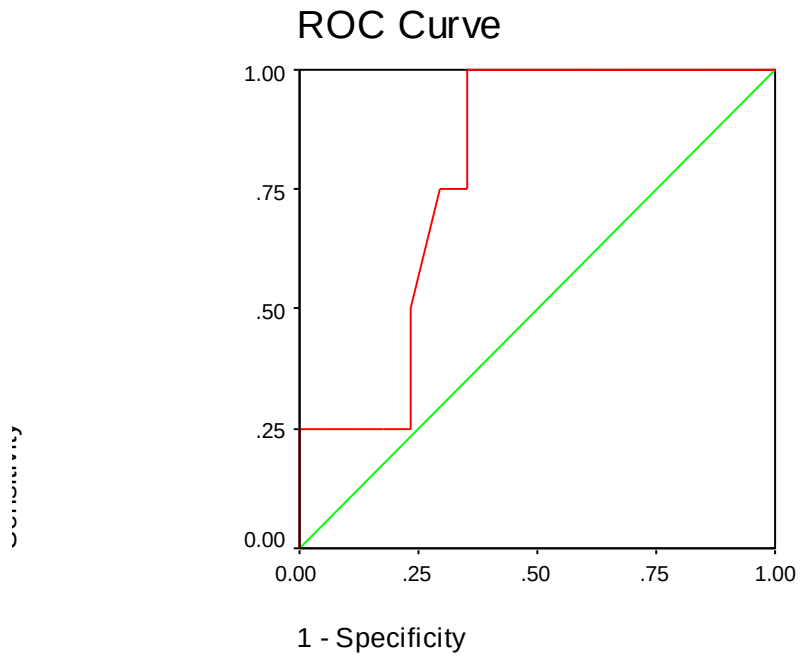

Figure (14): ROC curve

Area under curve = 78.7% with a combined sensitivity and specificity of 75 and 71.9% at the cutoff value of 2.2mg/dL.

Coordinates of the Curve

Test Result Variable(s): VAR00009

Positive if Greater Than or Equal To[a]	Sensitivity	1 - Specificity
.0000	1.000	1.000
1.1000	1.000	.941
1.2500	1.000	.882
1.3500	1.000	.824
1.4500	1.000	.765
1.5500	1.000	.706
1.6500	1.000	.647
1.7500	1.000	.588
1.8600	1.000	.529
2.0100	1.000	.471
2.2000	1.000	.353
2.3500	.750	.353
2.4500	.750	.294
2.5500	.500	.235
2.6500	.250	.235
2.7500	.250	.176
2.9000	.250	.118
3.1000	.250	.059
3.4000	.250	.000
4.6000	.000	.000

Table (16): Cut off point of umbilical cord bilirubin for subsequent hyperbilirubinemia > 17mg/dL at 4th day bilirubin.

Variable	Cut off point
u. cord bilirubin	2.2

From the table it was assumed that newborns with cord bilirubin 2.2mg/dL will develop hyperbilirubinemia > 17 mg/dL by the 4th day.

Table (17): Power of U.C.S bilirubin using a cut off of 2.2 mg/dL for prediction of subsequent hyperbilirubinemia > 17 mg/dL.

Sensitivity	100%
Specificity	65%
PPV	70%
NPV	88%