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A comparative study of electrolyte changes in newborns delivered after 35 weeks of gestation before and after receiving phototherapy in a tertiary care hospital.

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Abstract:
Background:*Neonatal jaundice is a common benign problem in most newborns. In most newborns, unconjugated hyperbilirubinemia reflects a normal physiological process[1]. Phototherapy plays a significant role in treatment of hyperbilirubinemia. As any treatment has its side effects, phototherapy also has known adverse effects like hyperthermia in summer and hypothermia in winter, feed intolerance, loose stools,, dehydration, hypocalcemia, redistribution of blood flow and genotoxicity.Therefore, this study has been taken up to get a clear picture of post phototherapy electrolyte levels in newborns admitted in Sick Newborn Care Unit of in Bankura Sammilani Medical College.*
Materials and Methods: *in this prospective study 74 newborns admitted for neonatal jaundice and receiving phototherapy. Serum sodium,potassium and calcium level was measured by collecting venous blood before and 48 hours after phototherapy. Serum electrolytes were measured in Roche 9180 electrolyte analyzer. Total serum bilirubin was measured by capillary tube method. Pre and post phototherapy serum electrolytes level werecompared and correlation of electrolyte change with gestational age and birth was also calculated.*
Results: *The study was conducted at SNCU, Bankura Sammilani Medical College with total study population being 74. Before and after 48 hours of phototherapy for neonatal hyperbilirubinemia serum electrolytes were estimated There was significant change of mean values of serum sodium, potassium and calcium level post phototherapy. Occurrence of post phototherapy hyponatremia and hypocalcemia were significant in preterm and low birth weight neonates. As for pre and post phototherapy mean serum potassium level no correlation could obtained change with birth weight and gestational age in the study.*
Conclusion: *phototerapy can change serum sodium and calcium level which is more obvious in preterm and low birth weight babies.The clinical and therapeutic implications of that has to be established in further studies.*
Key words: *phototerapy,electrolytes,newborn,preterm,term.*

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I. Introduction

Jaundice in newborns is usually observed in the first week of life. Clinical jaundice develops in two third of normal neonates.In most newborns, unconjugated hyperbilirubinemia reflects a normal physiological process. Neonatal jaundice nearly affects 60% of term and 80% of preterm neonates duringfirst week of life[2]. In the first week of life, jaundice is usually unconjugated. Neonatal jaundice can be either physiological or pathological.Elevated levels of unconjugated bilirubin can lead to bilirubin encephalopathy and subsequently kernicterus, with devastating permanent neurodevelopment abnormality[3]. Conjugated hyperbilirubinemia indicates potentially serious intrahepatic or extrahepatic disorders or even systemic illnesses.Phototherapy plays a significant role in treatment of hyperbilirubinemia. As any treatment has its side effects, phototherapy also has known adverse effects like hyperthermia in summer and hypothermia in winter, feed intolerance, loose stools,skin rashes, bronze baby syndrome, retinal changes, dehydration, hypocalcemia, redistribution of blood flow and genotoxicity[4] Therefore, this study has been taken up to get aclear picture of post phototherapy electrolyte levels in newborns admitted in Sick Newborn Care Unit of in Bankura Sammilani Medical College.

II. Material And Methods

This prospective study was carried out on patients of Department of Pediatric Medicine Sick Newborn Care Unit of in Bankura Sammilani Medical College and hospital from february 2018 to july2019.
Ethical clearance was taken from institutional ethics committee.

Study Design: Prospective observational study.
Study Location: The study was conducted at SNCU of Department of Paediatrics, Bankura SammilaniMedical College & Hospital.
Study Duration: One and half year: February, 2018 to July, 2019.
Sample size: N= $(1.96)2\times13\times(100-13)/8^2$
N = sample size, P = Prevalence of event of interest=13% (as stated in previous literature),91 Zα =1.96(two tailed) at 95% confidence interval, L= Allowable error around the prevalence=8.
Therefore, N ≈ 68. Considering 8% refusal in the study total population of the study was 74.
sample design: Study populations were selected once in week × 10 months. As per the record of SNCU admission, daily on an average 3 inborn and outborn neonates admitted for phototherapy for neonatal jaundice. The first day was selected by simple random sampling and then, each of the days of the week was covered by rotation in the successive weeks. Thus the sample population includes 74 newborns receiving phtototherapy after fulfilling inclusion and exclusion criteria.
inclusion criteria: Newborn who are delivered after 35 completed weeks of gestation, exclusively breastfed or fed with expressed breast milk and receiving phototherapy.
exclusion criteria: 1.Neonates delivered before 35 completed weeks of gestation.
2. Neonates with Onset of jaundice < 24 hrs.
3. Those receiving exchange transfusion.
4. Neonates with conjugated hyperbilirubinemia.
5. Neonates who receive I.V fluid and intensive care.
6. Neonates with formula feeding.
7. Neonates with co-morbidities like birth asphyxia, sepsis, acute renal failure and others.
8. Abnormal electrolyte status detected prior to phototherapy.
9. Neonates with acid base imbalance, very low birth weight babies (birth weight <1500g).
10. Neonates with major congenital abnormalities.

Procedure methodology:
To assess neonatal jaundice: Total serum bilirubin.
To assess pre and post-phototherapy electrolytes: Sodium, potassium, calcium **(** Na+, K+ ,Ca++) before starting phototherapy and 48 hours after receiving phototherapy.
To determine the gestational age:
1) by last menstrual period of mother
2) by antenatal ultrasonography
3) by modified Ballard score92
After assessing gestational age newborns divided into
1) **Preterm**: Gestational age <37 weeks.
2) **Term**: Gestational age ≥37 weeks.
Newborns are classified in normal and low birth weight according to their birth weight.
Normal birth weight: Birth weight 2.5 kg or more.
Low birth weight: Birth weight below 2.5kg.
After assessment of gestational age newborns are categorized into groups SGA and AGA based on intrauterine growth chart[5,6].
a. **Small for gestational age** (**SGA**) babies are defined as birth weight below the 10th percentile for the gestational age.
b. **Appropriate for gestational age (AGA)** defined as the birth weight is appropriate for the gestational age (weight between 10th and 90th percentile).
c. **Large for gestational age (LGA)** defined as the birth weight more than 90th percentile for gestational age.
Study Tools:
1) Predesigned proforma
2) Total serum bilirubin was estimated at SNCU, Bankura Sammilani Medical College by capillary tube method.
3) Pre and post phototherapy (after 48 hours) sodium, potassium were measured at central laboratory of Bankura Sammilani Medical College by electrolyte autoanalyzer. Serum calcium before and after phototherapy was measured by the same method.
study technique
After obtaining ethical clearance from the Institutional Ethics Committee, study was conductedamong the study population after taking informed consent from the guardian parents. The mothers of the selected newborns were interviewed with predesigned proforma.

Newborn babies who were more than 35 weeks of gestation were examined clinically.
Total serum bilirubin was measured before starting phototherapy by using capillary tube.

Blood was drawn in a capillary tube then centrifuged in REMI R-12C plus centrifuged machine for 5 minutes with 10000 rpm. By this serum was separated and total serum bilirubin was measured in Ginevri one beam photometric machine. Total serum bilirubin was monitored by this method regularly and after 48 hours.
Those newborns who had serum bilirubin above phototherapy range according to American Academy of Pediatrics, Hyperbilirubinemia management.[7] Before starting phototherapy blood sample was collected in a plain vial for estimation of serum sodium, potassium and calcium(Na+, K+, Ca++).After that blood was centrifuged for 5 minutes and serum is separated. Serum was spontaneously taken by Roche 9180 electrolyte autoanalyzer. After 48 hours of phototherapy electrolytes were measured by same method.
Newborns those who required phototherapy for neonatal jaundice were put under phototherapy with 460 nm blue light LED phototherapy machine.
Case definition: Serum calcium when less than 7mg/dl in newborn is considered as hypocalcaemia.[8]
Serum sodium when less than134 meq/l in newborn is considered as hyponatremia[8]
Serum potassium when less than3.5 meq/l in newborn is considered as hypokalemia.[9]
Plan for analysis of data: Data was collected, recorded & compiled on Microsoft Excel datasheet. Statistical methods (mean, standard deviation) and MedCalc 19.0.7 version software was used to analyze the data. Study of significance was analyzed by Chi square test for qualitative data and paired-t test for quantitative data. P value <0.05 is considered significant. All calculation was done on the basis of number of cases included in the study.

Fig.no.1-Roche 9180 electrolyte analyzer used for electrolyte measurement.

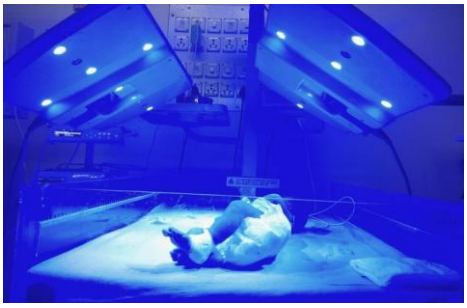

Figure No.-2 Newborn receiving phototherapy in SNCU.

III. Result

Table No-1: Categorization of study population according to gender (n=74).

Gender	No. of Newborn	Percent (%)
boy	39	52.70
girl	35	43.30
total	74	100

Out of total 74 newborns were enrolled in study, 39(n=74, 52.70%) were boy and 35(n=74, 47.30%) were girl.

Table No-2: Distribution of newborns according to ethnicity (n=74).

Ethnicity	No.of newborn	Percent(%)
Nontribal	58	78.38
Tribal	16	21.62
Total	74	100

In the study total 74 newborns were taken and 58 of which were nontribal (n=74, 78.38%) and 16 were from tribal (n=74, 21.62%) population.

Table No-3: Showing distribution according to gender and ethnicity (n=74).

Gender	Ethnicity		Total	Percent(%)
	Non Tribal	Tribal		
Boy	33	6	39	52.7
Girl	25	10	35	47.3
Total	58	16	74	100

Total 39 newborns (52.70%, n=74) were boy and among them, 33(84.62%) were from nontribal and 6(15.38%) were from tribal population. 35 out of 74 were girl and among them 25(71.43%) were nontribal and 10(28.57%) were tribal.

Table No-4: Distribution of study population in normal and low birth weight (n=74).

Birth weight	**No.of newborn**	**Percent(%)**
Normal (>2.5kg)	43	58.11
Low (<2.5kg)	31	41.89
Total	74	100

In the study total population were 74 out of which 43 newborns (58.11%) were normal birth weight newborn and 31 newborns (41.89%) were low birth weight newborns.

Table No-5: Categorization of study population according to gestational age into preterm and term(n=74).

Gestational age	**No.of newborn**	**Ppercent(%)**
Term (>37week)	57	77.03
Preterm (<37week)	17	22.97
Total	74	100

Overall frequency: 57(n=74, 77.03%) were term and 17(n=74, 22.97%) newborns were preterm in the study.

Table No-6: Showing distribution of study population according to AGA and SGA (n=74).

Parameter	Frequency	Percent(%)
AGA	56	75.68
SGA	18	24.32
Total	74	100

Out 74 newborns in the study 56(n=74, 75.68%) were AGA and 5 (n=74, 24.32%) were SGA newborn. In the study LGA newborns were not obtained.

Table No-7 Showing distribution according to ABO incompatibility (n=74).

ABOincompatibility	**Frequency**	**Percent(%)**
Present	12	16.22
Absent	62	83.78
Total	74	100

Only 12 of 74 study population having ABO incompatability and 62 did not have ABO incompatabilty.

Table No.8: Distribution of newborns according to different Rh blood group of mother and bantby (n=74).

Difference in ABO group	**Frequency**	**Percent(%)**
Present	5	6.76
Absent	69	93.24
Total	74	100

5 newborns (n=74, 6.76%) had Rh blood group difference and 69 newborns (n=74, 93.24%) did not had Rh blood group difference.

Table No.9: showing distribution according to onset of phototherapy (n=74).

Hours of phototherapy	**Frequency**	**Percent (%)**
48-96 hour	56	75.68
>96 hours	18	24.32
Total	74	100

During the study phototherapy was started on 48-96 hours, for 56(75.68%) newborns and 18(24.32%) received their phototherapy on >96 hours.

Table No.10: Correlation of pre and post phototherapy bilirubin (n=74).

Parameters	Pre-Phototherapy Bilirubin	Post-Phototherapy Bilirubin	P value.
Mean	20.41±1.57	14.03±1.05	P<0.0001
95% CI of Mean	20.01 - 20.78	13.79 - 14.28	
Median	20.25	14.15	
IQR			

Mean of pre phototherapy and post phototherapy bilirubin were 20.41±1.57 and 14.03±1.05. There was statistical significance found among two groups (P<0.0001, Paired-t test).

Table No.11: Correlation of pre and post phototherapy sodium (n=74).

Parameters	Pre-Phototherapy sodium	Post-Phototherapy sodium	P value
Mean	140.24±2.50	137.17±3.83	P<0.0001
95%CIof mean	139.66 - 140.82	136.28 - 138.06	
Median	139.79	137.84	
IQR	138.52 - 142.39	133.25 - 139.97	

Mean of pre and post phototherapy sodium were 140.24±2.50 and 137.17±3.83. There was statistical significance between these two groups (p<0.0001, paired-t test).

Table No.12: Correlation of pre and post phototherapy potassium (n=74).

Parameters	Pre-Phototherapy potassium	Post-Phototherapy potassium	P Value
Mean	4.24±0.48	3.95±0.31	P<0.0001
95% CI of Mean	4.13 - 4.35	3.88 - 4.02	
Median	4.22	3.91	
IQR	3.89 - 4.42	3.69 - 4.18	

Mean of pre and post phototherapy potassium were 4.24±0.48 and 3.95±0.31. There was statistical significance between these two groups (p<0.0001, Paired-t test).

Table No.13: Correlation of pre and post phototherapy calcium (n=74).

Parameters	Pre-Phototherapy calcium	Post-Phototherapy calcium	P Value
Mean	8.98±0.52	8.26±0.99	P<0.0001
95% CI of Mean	8.85 - 9.18	8.03 - 8.49	
Median	9.03	8.65	
IQR	8.58 - 9.43	7.55 - 8.98	

Mean of pre and post phototherapy calcium were 8.98±0.52 and 8.26±0.99. There was statistical significance found among two groups. (P< 0.0001, Paired-t test).

Table No-14: Correlation of post phototherapy sodium and gestational age (n=74).

Post-phototherapy sodium level	Term newborn	Preterm newborn	Total	P Value
<134meq/l	9	13	22(29.73%	P<0.0001
134-145meq/l	48	4	52(70.27%)	
>145meq/l	0	0	0	
Total	57(77.03%)	17(22.97%	74	

After the study it was seen that total 22(29.73%) had hyponatremia. 9(18.75%) of term newborns and 13(76.47%) were preterm newborns. Their post phototherapy sodium was below 134meq/l it was statistically significant (p<0.0001, Chi-square test).

Table No-15: Correlation of post phototherapy sodium and birth weight (n=74).

Post-phototherapy sodium level	Normal birth weight	Low birth weight	Total	P value
<134meq/l	3	19	22(29.73%)	P<0.0001
134-145meq/l	40	12	52(70.27%)	
>145meq/l	0	0	0	
Total	43(58.11%	31(41.89%)	74	

After 48 hours of phototherapy 3(6.98%) of 43 normal birth weight newborns and 19(61.29%) of low birth weight newborns sodium level was less than 134meq/l. There were statistical significance between these two groups (p<0.0001, Chi-square test).

Table No-16: Correlation of post phototherapy potassium and gestational age (n=74).

Post-phototherapy potassium level	Term newborn	Preterm newborn	Total	P Value
<3.5meq/l	1	1	2(2.70%)	P=0.3602
3.5-4.5meq/l	56	16	72(97.30%	
>4.5meq/l	0	0	0	
Total	57(77.03%)	17(22.97%)	74	

Only one term and one preterm newborn had post phototherapy potassium level below 3.5meq/l. The difference between two groups were not statistically significant. (p=0.3602, Chi-square test).

Table No-17: Correlation of post phototherapy potassium and birth weight (n=74).

Post-phototherapy potassium level	Normal birth weight	Normal birth weight	Total	P value
<3.5meq/l	1	1	2(2.70%)	P=0.8150
3.5-4.5meq/l	42	30	72(97.30%)	
>4.5meq/l	0	0	0	
Total	43(58.11%)	31(41.89%)	74	

Only one newborn of normal and low birth weight group of this study had post phototherapy potassium level less than 3.5meq/l. There were no statistical significance present among them (p=0.8150, Chi-squaretest).

Table No-18: Correlation of post phototherapy calcium and gestational age (n=74).

Post phototherapy calcium level	Term newborn	Preterm newborn	Total	P value
<7 mg/dl	2	13	15(20.27%)	P<0.0001
7-9 mg/dl	42	4	46(62.16%)	
9-11mg/dl	13	0	13(17.57%)	
Total	57(77.03%)	17(22.97%)	74	

In the study total 57(n=74, 77.03%) newborns were term among them 2(3.50%) had calcium level below 7mg/dl. total preterm newborns in the study was 17(n=74, 22.97%) out of which 13(76.47%) had calcium below 7mg/dl after 48 hours of phototherapy. There was statistical significance between these two groups (p<000.1, Chi-square test).

Table No-19: Correlation of post phototherapy calcium and birth weight (n=74).

Post phototherapy calcium level	Normal birth weight	Normal birth weight	Total	P value
<7 mg/dl	2	13	15(20.27%)	P=0.0001
7-9 mg/dl	29	17	46(62.16%)	
9-11mg/dl	12	1	13(17.57%)	
Total	43(58.11%)	31(41.89%)	74	

In the study 2(4.65%) of 43 normal birth weight newborns post phototherapy calcium was below 7 meq/l and 13(41.94%) low birth weight newborns post phototherapy calcium were below 7 meq/l. Post phototherapy calcium level in low birth weight babies was significantly low as compared to normal birth weight babies (p=0.0001,Chi-square test).

IV. Discussion.

Neonatal Hyperbilirubinemia is one of the commonest abnormal physical finding during the first week of life. Early discharge of healthy term newborns from the hospital after delivery has recently become a common practice for medical, social and economic reasons. However, discharge at any time before 72 hours significantly increases the risk for readmission to hospital with hyperbilirubinemia when compared with discharge after 72 hours of life.[10]

Phototherapy has emerged as the most widely used form of treatment for neonatal jaundice and is the current therapy of choice to reduce severity of neonatal unconjugated hyperbilirubinemia.

In addition to known effects like temperature alteration, increase in fluid requirement, dermatological manifestations like skin rash, phototherapy to manage neonatal jaundice may also influence level of serum electrolytes.

Currently there are few studies available that depicts alteration of serum level of electrolytes after phototherapy. This study was taken up in Bankura Sammilani Medical College and Hospital because of paucity of data regarding serum electrolyte changes in newborns after phototherapy in this part of country.

In the present study 74 newborns were enrolled, of them 39 were boy and 35 were girl(52.70% boy, 47.30% girl), male and female ratio being 1.1:1. One international study conducted in Iran for prevention of phototherapy induced electrolyte change, percentage of male and female babies were 53.5% and 46.5% in the group with intervention, and 20% and 23% in the group without intervention respectively. [11]

Among the scant Indian studies, Reddy AT et al conducted a study on neonates to assess "Electrolyte changes following Phototherapy in neonatal hyperbilirubinemia" with male and female ratio being1.45:1.[12]

Among the total 74 cases, 39 newborns (52.70%) were boys; among them 33(84.62%) were from nontribal and 6(15.38%) were from 51 tribal population. Among the 35 baby girls included in the study, 25(71.43%) were nontribal and 10(28.57%) were tribal. Currently enough literature is not available regarding ethnicity of study group on neonatal phototherapy and electrolyte change.

In another study conducted by Bezboruh G and Majumder A K (2019) to show the "Electrolyte imbalance in neonates after Phototherapy", it was seen that 38.83% of the population were low birth weight neonates and 61.17% were normal birth weight neonates.[13] Our study has almost similar birth weight distribution as compared to the study conducted by Bezboruh et al.

In an Indian study done by Krishna P, Soans ST showed that 20.2% newborns were preterm and 79.8% were term newborns, when they assessed the effect of phototherapy on serum electrolytes.[14] So the findings of this study was consistent with our study.

It is well established that ABO and Rh incompatibility both are important causes of neonatal jaundice.[15].In this context, 12 newborns in the present study had ABO incompatibility, which consisted16.22% of the study population. In the current study, 5 newborns had Rh blood group different from that of the mother and it accounted for 6.76% of the population included. In all those 5 newborns, direct coomb test was negative indicating some cause of neonatal hyperbilirubinemia apart from Rh incompatibility. In a Turkish study conducted by Sarici SÜ et al found that incidence of ABO incompatibility in neonatal jaundice was 14.8%.[16] In an Indian study entitled "ABO and Rh incompatibility with neonatal hyperbilirubinemia" by Patel AS et al, incidence of ABO incompatibility was 13.79%.[17] The incidence of ABO incompatibilityin our study is consistent with both these studies.

The frequency of Rh negative blood group is 5% in Indian population as against 15% in Europeans.[18]Our study population had 6.76% of Rh blood group difference between the mother and baby, which issupported by this data.

In the current study, mean bilirubin level before phototherapy was 20.4±1.57 and after phototherapy was14.03±1.05. In similar studies on electrolyte changes after phototherapy by Suneja S et al, mean pre and post phototherapy bilirubin were 16.39±5.46 and 11.23±3.49 respectively. This is contrast to our study, where pre and post phototherapy bilirubin were much higher .108 Gayal S et al conducted a similar study and found mean bilirubin level before and after phototherapy as 19.4±2.78 and 11.18±3.11.[19]

In the current study, mean bilirubin level before phototherapy was 20.4±1.57 and after phototherapy was 14.03±1.05. In similar studies on electrolyte changes after phototherapy by Suneja S et al, mean pre and post phototherapy bilirubin were 16.39±5.46 and 11.23±3.49 respectively. This is contrast to our study, where pre and post phototherapy bilirubin were much higher .[20]

In our study, we measured serum electrolytes 48 hours of phototherapy. In the study population post phototherapy hyponatremia, hypokalemia, hypocalcemia were 29.73%, 2.70% and 20.27% respectively. Pre and post phototherapy mean of serum sodium level in this study were 140.24±2.50 and 137.17±3.83. There was significant decline in serum sodium level ($p<0.0001$).

Rangaswamy KB et al conducted a study on serum sodium and potassium changes in neonates receiving phototherapy found that mean serum sodium before and afterphototherapy were 140.57±2.68 and 137.56±2.55.110The serum sodium values obtained in this study is consistent to our mean serum sodium level before and after phototherapy. Suneja

S et al in their study showed that pre-phototherapy mean serum sodium level was159.38±22.7 and post phototherapy mean sodium level was 148.80±10.7.108This is in contrast to the value of mean sodium levels before and after phototherapy in our study.

After 48 hours of phototherapy 29.73% of total population developed hyponatremia. In this context,18.75% of term newborns and 76.14% of preterm newborns had post-phototherapy hyponatremia. The result was statistically significant in preterms with p value<0.0001. Bezboruah G et al in their study found 11.02% of term and 18.31% preterm newborns had hyponatremia after phototherapy.[13] Another study by Kumar S et al, 3.1% of term and 17.5% of preterm newborns developed hyponatremia.[21] This is incontrast to our study where hyponatremia is much higher among the preterm neonates after 48 hours of phototherapy.

Pre and post phototherapy mean of potassium in our study were 4.74±0.48 and 3.95±0.31 and the p value was <0.0001. It suggests significant change of serum potassium levels after phototherapy. Occurrence of post phototherapy hypokalemia in our study was 2.70%.

The percentage of term neonates having hypokalemia after phototherapy was 1.79%, whereas 5.88% of preterm neonates had post phototherapy hypokalemia. P value in these two groups was 0.3602. Post phototherapy potassium change and its relation with gestational age was not significant in our study. It was also noted in the study that the correlation among post phototherapy potassium change and birth weight was insignificant (p=0.8150).

20.27% of newborn had hypocalcemia after phototherapy. Mean of calcium level at onset of phototherapy 8.96±0.52 mg/dl and after 48 hours of phototherapy was 8.26±0.99 mg/dl, in the study. P value was <0.0001, which suggest significant fall on calcium level. In some previous literature it was noted that neonates after getting phototherapy incidence hypocalcemia was significant. Post phototherapy mean calcium level is

consistent with the study done by Goyal S et al. Karamifar et al (2002),[22] in his study titled "Prevalence of phototherapy induced hypocalcemia" at endocrinology and metabolism and division of neonatology,Shiraz university.

In our study, occurrence of hypocalcemia of was 20.27% among them 3.50% term neonates and 76.47% preterm neonates had hypocalcemia. Yadav RK et al[22] (2012) in his work "The evaluation of effectof phototherapy on serum calcium level" had studied the effects of phototherapy in 20 term and 20 preterm neonates. After 48 hours of phototherapy there was siginificant hypocalcemia in 80% preterm and 66.6% term neonates. At the end of our study it was noticed that 4.65% of normal birth weight neonates and 41.94% of low birth weight neonates were hypocalcemic 48 hours of post phototherapy with p value equal to 0.001. Only few data is available that compares birth weight with hypocalcemia after phototherapy. Reddy AK et al[12] (2015) in their study found 36.2% low birth weight babies and 6.2% normal birth weight were hypocalcemic after 48 hours of phototherapy and p value was <0.001. The occurrence of hypocalcemia in low birth weight neonates after phototherapy in our study and study by Reddy et al are similar and statistically significant. However no such correlation could be obtained in term babies in both studies.

V. Conclusion

Occurance of post phototherapy hyponatremia and hypocalcemia were significant in preterm and low birth weight neonates, As for pre and post phototherapy mean serum potassium level no correlation could obtained change with birth weight and gestational age in the study.

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