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A study to assess the efficacy of phototherapy with low cost white curtains versus routine phototherapy among newborns admitted with neonatal jaundice in NICU of GGSMC & H, Faridkot, Punjab

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Abstract
Aim of the study: The study was intended to assess the efficacy of phototherapy with low cost white curtains versus routine phototherapy on reducing serum bilirubin level in newborns.
Material and Methods: A quantitative research approach and experimental research design was used to conduct the present study. The total 70 patients (above 32 weeks of gestational age) were selected who were admitted in Neonatal Intensive Care Unit on the basis of Inclusion and exclusion criteria and randomly allocated into experimental and conventional group through computerized block design method. Socio-demography data sheet was used to collect baseline information and Lab investigation was used to collect the data.
Results: The present study results revealed that pre intervention mean± SD of total serum bilirubin level in phototherapy with low cost white curtain (experimental group) was 15.457±1.145 and was 15.263±1.602 in routine photo therapy (conventional group) respectively. Post intervention mean± SD of total serum bilirubin level in photo therapy with low cost white curtain (experimental group) was 10.351±1.55 and was 11.389±1.39 in routine phototherapy (conventional group) respectively. Paired t test and individual t test was applied for statistical analysis. Results reveals that t value in experimental group was 14.759 at df 34 with p value 0.001 and 22.435 at DF 34 with p value 0.001 in experimental and conventional group which is found to be significant at p=0.005. It proved that there is significant difference in baseline mean of reduction in total serum bilirubin level in neonates who were on phototherapy with low cost white curtains.
Conclusions: On the basis of the findings of the study, it was concluded that Phototherapy with low cost white curtains is more effective in reducing the total serum bilirubin level in neonates having jaundice than routine phototherapy.

Keywords: Neonatal jaundice, neonates, phototherapy, white curtains, lab investigation

Introduction
Newborn jaundice is most common problem worldwide [1]. About 65-75% of term newborn have jaundice, but in preterm neonate, this percentage increases and reaches to 80% [2]. It is effectively treated with phototherapy. Sometime, multiple phototherapy units are used to increase the light intensity that can improve the efficacy of phototherapy. Intensity of light and the area of light exposed skin can also be increased with the help of reflecting surfaces (e.g. white curtains hung from the sides of the phototherapy unit) [1] K. Ari *et al*, (2011) conducted a study on single phototherapy with white curtains hanging from the sides of the phototherapy unit (study group, n=30) was compared to single phototherapy without curtains (control group, n=30). Result shows that sum of average spectral irradiance in the curtained phototherapy unit was significantly higher than that of the standard phototherapy unit without curtains ($P< 0.05$). The decrease of total serum bilirubin levels after 12 and 24 hours of phototherapy was significantly greater in the study group (3.71 and 9.7 mg/dl, respectively) than in the control group (0.1 and 3.8 mg/dl, respectively), both $P< 0.05$. White, reflecting curtains in phototherapy units was significantly more effective than phototherapy without curtains for treatment of neonatal jaundice [3].

Methodology

1. Research Approach
In this study, Quantitative research approach was used.

2. Research Design
The research design selected for this study was a quantitative randomized control trial (Experimental research design).

3. Study area
Study was conducted in neonatal intensive care unit of GGSMC&H, Faridkot Punjab.

4. Sample
Sample of the Present study included newborn having gestational age above 32 weeks with jaundice admitted in Neonatal Intensive Care Unit of G.G.S. Medical College and Hospital, Faridkot, Pumjab.

5. Sample size
Sample size was 70 randomly allocated 35 in each experimental and conventional group.

6. Sampling Technique
The subjects were selected on the basis of inclusion and exclusion criteria and randomly allocated into experimental and conventional group through computerized block design method.

7. Tool
Tool A: It consist of information regarding socio demographic variable such as age of newborn in hours, gender, weight of newborn in grams, gestational age in week, blood group of newborn, type of feed, mother's age, mother's blood group.
Tool B: It consists of clinical profile sheet, Rh-Incompatibility in baby, DCT, G6PD deficiency and TSH.
Tool C: It include total serum bilirubin level record sheet.

8. Ethical Consideration
Study approval was taken from research and ethical committee of University College of nursing, and BFUHS, Faridkot. Keeping in mind the legal rights of the study subject, only those who were willing to participate were included in the study. Written informed consent was taken from family member of each study subject after explaining them about study, its objectives and its benefits. Confidentiality was maintained throughout the study.

Data Collection
As the study participants were neonates age above the 32 weeks of gestational, were selected. A cotton cloth which is white in color was used along with phototherapy to reduce the mean bilirubin concentration and the duration of phototherapy in neonates who were suffering from jaundice. Written informed consent was taken from the parents of the subject and the patient information sheet was also provided to them. Researcher first introduced herself to the study subjects and assured that their response would be kept confidential and used only for the study purpose.

a) Firstly, selected the study subject according to the inclusion /Exclusion criteria and randomly allocated them into Experimental group and Conventional group.
b) As the procedure of phototherapy start, a white curtain is applied on the phototherapy which is covered three sides of the phototherapy unit, Front side was kept open for observation of the baby and performing procedure.
c) The researcher recorded the data with the help of Clinical profile sheet after giving intervention along with phototherapy.
d) At the end the researcher compared the level of serum bilirubin in both experimental and conventional group and also assesses the efficacy of low cost white curtains using statistical analysis.
e) Statistical analysis was performed using SPSS 20.0.

Results

Table 1: Frequency and Percentage distribution of the newborns as per socio-demographic characteristics among phototherapy with low cost white curtain and routine phototherapy N= 70.

S. No	Sample characteristics	Phototherapy with low cost white curtain (N-35)		Routine phototherapy. (N-35)		Total	x^2 DF	p- value
		Freq	%	Freq	%	Freq (%)		
1	**Age of the newborns hours**							
	Within 24 hours	00	00	00	00	00	5.183 2	0.075^{NS}
	24 to 48 hours	11	31.4	08	22.8	27.1		
	48 to 72 hours	23	65.7	20	57.1	61.4		
	After 72 hours	01	02.8	07	20.0	11.4		
2	**Gender**							
	Male	20	57.1	13	37.1	47.1	2.809 1	0.094^{NS}
	Female	15	42.8	22	62.8	52.8		
3	**Weight of the newborn**							
	1000-1500gms	00	00	00	00	00	5.276 2	0.071^{NS}
	1501-2000gms	03	08.5	09	25.7	17.1		
	2001-2500gms	13	37.1	15	42.8	40		
	2501-3000gms	19	54.2	11	31.4	42.8		
	More than 3000gms	00	00	00	00	00		
4	**Gestational Age in weeks**							
	32 - ≤34weeks	10	28.5	11	31.4	30	1.905 2	0.386^{NS}
	>34 - ≤36weeks	20	57.1	15	42.8	50		
	>36 - ≤40weeks	05	14.2	09	25.7	20		
5	**Blood Group of newborn**							
	O-	00	00	00	00	00	7.137	0.068^{NS}

	O+	00	00	00	00	00	3	
	A-	00	00	00	00	00		
	A+	18	51.4	08	22.8	37.1		
	B-	2	05.7	01	02.8	04.2		
	B+	10	28.5	17	48.5	38.5		
	AB-	00	00	00	00	00		
	AB+	5	14.2	9	25.7	20		
6	**Type of feed**							
	Exclusive breast feeding	14	40	12	34.2	37.1	0.245 1	0.621^{NS}
	Formula feed	21	60	23	65.7	62.8		
7	**Mother's Age**							
	18-22	0	0	2	05.7	02.8	2.167 3	0.539^{NS}
	22-25	21	60	21	60	60		
	25-30	13	37.14	11	31.4	34.2		
	Above 30	1	02.8	1	02.8	02.8		
8	**Blood Group of mother**							
	O-	00	00	00	00	00	6.555 6	0.364^{NS}
	O+	15	42.85	18	51.42	47.14		
	A-	2	5.71	00	00	2.85		
	A+	1	2.85	2	5.71	4.28		
	B-	1	2.85	2	5.71	4.28		
	B+	5	14.28	2	5.71	10		
	AB-	1	2.85	4	11.42	7.14		
	AB+	10	28.57	7	20	24.28		

NS=Non significant at $p > 0.05$

Table 2: Clinical profile sheet Frequency and percentage distribution of newborns as per the clinical profile among phototherapy with low cost white curtain and routine phototherapy N=70.

S. No.	Sample characteristics	Phototherapy with low cost white curtain (N-35)		Routine phototherapy (N-35)		Total Freq (%)	x^2 DF	p- value
		Freq(n)	%	Freq(n)	%			
1	**Rh-Incompatibility**							
	Present	22	62.8	26	74.2	68.571	1.061	0.303^{NS}
	Absent	13	37.1	09	25.7	31.428	01	
2	**DCT**							
	Positive	07	20	05	14.2	17.142	0.402	0.526^{NS}
	Negative	28	80	30	85.7	82.857	01	
3	**G6PD deficiency**							
	Present	05	14.2	08	22.8	18.571	0.850	0.356^{NS}
	Absent	30	85.7	27	77.1	81.428	01	
4	**TSH**							
	Normal	29	82.8	31	88.5	85.714	0.467	0.495^{NS}
	Abnormal	06	17.1	04	11.4	14.285	01	

NS=Non Significant at $p > 0.05$;

Table 3: Mean and standard deviation of Pre interventional level of bilirubin in neonates with jaundice under the phototherapy with low cost white curtain and routine phototherapy N = 70.

Assessment of Total serum bilirubin level	Phototherapy with low cost white curtains Mean± SD	Routine Phototherapy Mean± SD
Pre Intervention	15.457± 1.145	15.263± 1.6028

Table 3: depicts that Pre Intervention means baseline total serum bilirubin level in the phototherapy with low cost white curtains was 15.457± 1.145 and 15.263± 1.6028 in routine phototherapy respectively.

Table 4: Mean and standard deviation of Post interventional level of bilirubin in neonates with jaundice under the phototherapy with low cost white curtain and routine phototherapy N=70.

Assessment of Total serum bilirubin level	Photo Therapy with low cost white curtains. N=35		Routine Phototherapy N=35	
	Mean	SD	Mean	SD
Post intervention	10.351	1.55	11.389	1.39

Table 4 depicts that Post intervention mean± SD baseline total serum bilirubin in phototherapy with low cost white curtains was 10.351±1.55 and 11.389±1.39 in routine Phototherapy respectively.

Table 5: The comparison of bilirubin level as per total serum bilirubin level record sheet among phototherapy with low cost white curtain and routine phototherapy on 0 hour and 48 hour N=70.

Groups	Photo Therapy with low cost white curtains. (Mean ± SD) N=35	Routine phototherapy (Mean ± SD) N=35	T	DF	p value
Pre Intervention 0 hrs.	15.457±1.14	15.263±1.60	0.584	68	0.561
Post Intervention 48 hrs.	10.351±1.55	11.389±1.39	2.934	68	0.005*
	t value-14.759 p value-0.001*	t value -22.435 p value -0.001*			

*=significant at $p<0.05$

Table 5 depicts that pre intervention mean± SD of total serum bilirubin level in phototherapy with low cost white curtains was 15.457± 1.14 and 15.263±1.60 in routine phototherapy respectively. Post intervention mean± SD of total serum bilirubin level in phototherapy with low cost white curtains was 10.351±1.55 and 11.389±1.39 in routine phototherapy respectively. Paired t test and Independent t test was applied for statistical analysis. Results reveals that paired t value 14.759 at DF 34 with p value 0.001 in phototherapy with low cost white curtains and was 22.435 at DF 34 with p value 0.001 in routine phototherapy respectively. In the Individual t test, t value- 0.584 at 68 DF with the p value 0.561 at 0 hours and was t value- 2.934 at DF 68 with p value 0.005* It proved that both groups were significant but Post intervention at 48 hours was more significant at the level of p≤0.05. than pre-intervention at(0hours).

Discussion

The results of the study shows that Phototherapy with low cost white curtains is more effective than the routine phototherapy (p=0.005) which is supported by similar study K. Ari *et al*, (2011) [3] Single phototherapy with white curtains hanging from the sides of the phototherapy unit was compared to single phototherapy without curtains to decrease the total serum bilirubin level after 12 and 24 hours of phototherapy was significantly greater in the study group (3.71 and 9.7 mg/dl, respectively) than in control group (0.1 and 3.8 mg/dl, respectively), both $p< 0.005$ white, reflecting curtains in phototherapy unit was significantly more effective than phototherapy without curtains for the treatment of neonatal jaundice and

The Present study results revealed that pre intervention mean± SD of total serum bilirubin level in phototherapy with low cost white curtain was 15.457±1.14 and 15.263±1.60 in routine phototherapy respectively. Post intervention mean± SD of total serum bilirubin level in phototherapy with low cost white curtain was 10.351±1.55 and 11.389±1.39 in routine phototherapy. Paired t-test and individual t test was applied for statistical analysis. Result revealed that paired t value 14.759 at DF 34 with p value 0.001 in phototherapy with low cost white curtains and was - 22.435 at DF 34 with p value 0.001 in routine phototherapy respectively. In the Individual t test, t value- 0.584 at 68 DF with the p value 0.561 at 0 hours and was- 2.934 at DF 68 with p value 0.005* It proved that both groups were significant but Post intervention at 48 hours was more significant at the level of p ≤0.05 than pre-intervention at(0hours).These finding were supported by Consistent findings were supported by Tadi R *et al*, (2018) [4] that low cost white curtains with phototherapy was early reduction in total serum bilirubin level than without white curtains and mean absolute fall in TSB level was 6.01 mg/dl and in control group the mean absolute fall in TSB level was 3.07 mg/dl and t (5.22) value showed that there was significant difference in post mean TSB level between experimental and control group. Negi Rashmi *et al* (2015) [5] that phototherapy with reflecting curtains is an effective method in the treatment of neonatal hyperbilirubinemia requiring intensive phototherapy without evidence of increased adverse effect**.** Elsa Simi Philip *et al*, (2016) [6] that hanging low cost white curtains around the phototherapy units significantly increase the efficacy of phototherapy in the treatment of neonatal jaundice without evidence of any adverse effects. R Nair D *et al*, (2017) [7] that white curtain around the phototherapy unit is an effective method in reducing the serum bilirubin level and at the same time it also reduces the duration of phototherapy. This can be used as a cost effective and non-invasive method for the treatment of neonates with hyperbilirubinemia. The white curtain when made into practice can serve as a method that will reduce the hospital stay of the neonates thereby reducing the cost of treatment. M Akrem Atrushi (2015) [8] that the white curtains around the phototherapy is effective in the treatment of neonatal jaundice and the rate of TSB lowering increases is significantly higher in experimental group that in control group.

Recommendations

- Similar studies can be replicated with large samples with generalization.
- A comparative study can be conducted to find out the effectiveness of photo therapy with low cost white curtains and routine phototherapy reducing bilirubin level in neonates having jaundice.
- A study can be conducted to evaluate the knowledge and the attitude of nurses regarding photo therapy with low cost white curtains and routine.

An exploratory study can be done at various settings to identify factors influencing to photo therapy with low cost white curtains.

References

1. Jokomuljanto SD, Quah BS, Surini Y, Noraida R, Ismail NZN, Hansen TWR, *et al*. Efficacy of phototherapy for neonatal jaundice is increased by the use of Low Cost White reflecting curtains. ADC Fetal and neonatal editiv, 2006 Nov;91(6):F439-F442. Doi: 10.1136/adc.2006.095687.
2. Shirzadfar H, Sheikhi K, Meschian Z. The epidemiologic study of neonatal jaundice, relationship between jaundice and liver and alternative method to cure jaundice. Clinical practice 2019;16(3):1117-1125.

3. Kurniasih A, Tjipta GD, Ali M, Azlin E, Sianturi P. Effectiveness of phototherapy with reflecting curtains on neonatal jaundice. Paediatr Indones. 2011 September;51(5):256-258.
4. Tadi R, Varghese A. A Study to Assess the Efficacy of Phototherapy for Neonatal Jaundice with and Without the Use of Low-Cost White Reflecting Curtain at Selected Hospitals of Indore". 2019 September; 8(9):10.
5. Negi R, Sorte DP. Effect of white reflecting Curtains on Neonatal jaundice. 2015 January;7(4):147. doi:10.5958/0974-9357.2015.00209.3.
6. Phillip SE, Karale RB. The Effectiveness of phototherapy with low cost white curtains versus routine phototherapy among newborns admitted with neonatal jaundice. IJSR. 2016;5(4):511-514.
7. Nair DR, Dr. Vertiselvi P. Effect of white curtain around the phototherapy unit on hyperbilirubinemia in full term neonates. International journal of current research. 2017 Aug;9(8):55736-55739.
8. Atrushi AM. The effect of white curtains around phototherapy in the treatment of neonatal hyperbilirubinemia in Duhok. Global journal for research analysis, 2015 June;4(6).