Prediction and model of blood loss at 60 minutes after birth using shock index 30 minutes after birth

Introduction

At a hospital in Argentina, 480 women in active labor who did not have a c-section were the study subjects. To test whether intramuscular (IM) administration or intravenous (IV) route is the optimal route of administration of oxytocin to reduce PPH (blood loss) during the third stage of labor, a double-blinded, randomized controlled trial (with convenience sampling) was conducted. The ratio between pulse rate (HR) 30 minutes after birth (*HR30*) and systolic blood pressure 30 minutes after birth (*SBP30*) equals to shock index (SI) at 30 minutes after birth (SI30). Researchers focused on whether shock index at 30 minutes after birth (SI30) can predict blood loss at 60 minutes after birth (BloodLoss60) between the two groups. They also want to explore the best model to predict BloodLoss60.

Secondary Study Outcomes

Table 2. Study Outcomes by Study Group

	IV infusion group	**IM injection group**	**Relative Risk[a] or Estimate[b] (95% CI)**	***p*-value**
Sample size (n)	239	241	NA	NA
Post Hemoglobin (Hb) levels, mean (SD)	10.36±1.36	10.40±1.60	Difference: 0.04±2.96 95% CI: -0.23 to 0.32	0.73
Blood loss ≥ 500 ml, n (%)	49 out of 238 20.59%	57 out of 239 23.84%	RR: 0.96 95% CI: 0.87 to 1.06	0.39
Blood loss ≥ 750 ml, n (%)	21 out of 238 8.82%	31 out of 239 12.97%	RR: 0.95 95% CI: 0.90 to 1.02	0.15
Blood loss ≥ 1000 ml, n (%)	14 out of 238 5.88%	18 out of 239 7.53%	RR: 0.98 95% CI: 0.94 to 1.03	0.47

[a]Risk for IM group compared to risk in IV group.
[b]Difference in means comparing IM group to IV group.

From **Table 2**., we can see that the null value (0) falls within 95% confidence interval of the difference of the mean post hemoglobin levels, and we can say that the level between the two groups is different and since p value (0.73) is greater than 0.05, we fail to reject the hypothesis since we cannot prove that post hemoglobin levels different between IV and IM groups. Since null value (1) falls within the 95% confidence interval limits, we would not have enough evidence to say the relative risk of blood loss ratio (≥ 500 ml, 750 ml, and 1000 mL) is different between the two groups. We fail to reject the hypothesis and we cannot prove that the ratio of blood loss (≥ 500 ml, 750 ml, and 1000 mL) is associated with IM administration or IV route since the p values are greater than 0.05 since we lack evidence.

Model #1

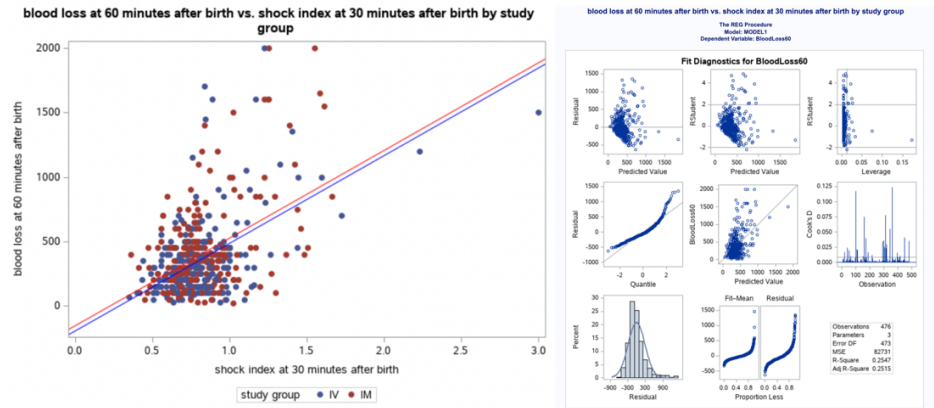


Figure 1. (Left) Fit plot of shock index 30 minutes after birth versus blood loss 60 minutes after birth by study groups. (Right) Diagnostic plots for the model.

According to **Figure 1.**, we can see a general pattern that when shock index in both IM and IV group increases, blood loss at 60 minutes after birth increases and the positive slope of the models (coefficient of SI30) proved that. Two indicators are listed in the graph (study groups and stock index at 30 minutes after birth). We can observe that more data from IM group appear with higher blood loss value at 60 minutes after birth, so IM group may more correlate to the BloodLoss60 value than the IV group. We proved this by fitting a model: Blood loss at 60 minutes after birth = -151.08 + 679.19 * SI30 – 37.57 * IV (1 for IV group and 0 for IM group)+error. For IV group, the equation from the fitted regression model is: Blood loss at 60 minutes after birth = -188.65 + 679.19 * SI30. For IV group, the equation from the fitted regression model is: Blood loss at 60 minutes after birth = -151.08 + 679.19 * SI30. After adjusting for study group, the blood loss at 60 minutes after birth is predicted to be 679.19 mL higher when stock index increases by 1. After adjusting for stock index at 30 minutes after birth, the blood loss at 60 minutes after birth is predicted to be 387.57 mL lower when the study group is IV. Since SI30 = HR30/SBP30 and pulse rate at 30 minutes after birth cannot be zero (dead), and the intercept is negative (not zero) for zero SI30 (or zero HR30) for IM group, which is outside of our study scope, the intercept is meaningless. The adjusted R^2 value for this model is 0.25, which taken account of the number of predictors in the model. It describes 25.2% of the variation in blood loss at 60 minutes after birth can be attributed to stock index at 30 minutes after birth and study groups. Number of pregnancies, maternal characteristics of age, and other factors may influence blood loss at 60 minutes after birth.

We assume the independence assumption that each observation is from a different person and the participants weren't matched or paired and randomness of the study. According to graphs on the right of **Figure 1**., the residual plot shows random scatter of points. We can prove the residuals are distributed normally since the histogram looks normal and the QQ plot is linear. There is no obvious fanning or tunneling in the residual plot and the residuals look consistently variable above and below the horizontal line. So, all the LINE assumption are met for this model.

According to our test, we are 95% confident that the true value of SI30 coefficient is between 573.31 and 785.07, which does not include 0. P value is less than 0.0001 which is less than 0.05. Thus, there is evidence of a non-zero slope between blood loss at 60 minutes after birth and stock index 30 minutes after birth, after adjusting for study group. We can reject the null hypothesis and the slope of SI30 is positive with a plausible range of values between 573.31 and 785.07.

"Best" Model

Table 3. Statistics of best model to predict blood loss at 60 minutes after birth.

Predictors	Models	Adjusted R^2
SI30, StudyGroup, Age, total number of pregnancies	BloodLoss60 = -199.38+663.51*SI30-38.89*IV+4.50*Age-19.93*NumPregnacies	0.25
SI30, StudyGroup, HbBaseline, DBPBaseline, HRBaseline, and SBPBaseline,	BloodLoss60 =-169.57+754.15*SI30-37.27*IV-12.63*HbBaseline+1.60*SBPBaseline+2.63*DBPBaseline-3.26*HRBaseline	0.28
SI30, StudyGroup, Age, TotalChildren, HbBaseline, DBPBaseline, HRBaseline, SBPBaseline, SBP45, DBP45, and HR45	BloodLoss60 =116.56+464.72*SI30-40.51*IV+2.34*Age-8.39*TotalChildren-12.52*HbBaseline+1.94*SBPBaseline+2.65*DBPBaseline-3.71*HRBaseline-4.99*SBP45+2.02*DBP45+3.54*HR45.	0.31

Besides SI30 and study groups, other predictors including maternal characteristics of age, number of pregnancies, number of children, HbBaseline, DBPBaseline, HRBaseline, SBPBaseline, SBP45, DBP45, and HR45 are taken into consider finding the "best" model. We tried to include more predictors to consider different factors that influence the blood loss at 60 minutes after birth. As we include more predictors, the increase of adjusted R^2 proved that more variation in blood loss at 60 minutes after birth can be attributed to stock index at 30 minutes after birth, study group, and other predictors as listed in **Table 3**. In three models, we can see increase of SI30 leads to increase of BloodLoss60 and IV group (compared to IM group) lead to decrease of BloodLoss60. Compared to other models, the "best" model after adjusting for study group is:

$$\begin{aligned}\text{BloodLoss60} &= 116.56 + 464.72 * \text{SI30} - 40.51 * \text{IV} + 2.34 * \text{Age} - 8.39 * \text{TotalChildren} - 12.52 \\ &* \text{HbBaseline} + 1.94 * \text{SBPBaseline} + 2.65 * \text{DBPBaseline} - 3.71 * \text{HRBaseline} \\ &- 4.99 * \text{SBP45} + 2.02 * \text{DBP45} + 3.54 * \text{HR45}\end{aligned}$$

Conclusion

To summarize, as the results shown above, stock index 30 minutes after birth is a significant predictor of blood loss at 60 minutes after birth after adjusting for study group. The best model for predicting blood loss at 60 minutes after birth is:

$$\begin{aligned}\text{BloodLoss60} &= 116.56 + 464.72 * \text{SI30} - 40.51 * \text{IV} + 2.34 * \text{Age} - 8.39 * \text{TotalChildren} - 12.52 \\ &* \text{HbBaseline} + 1.94 * \text{SBPBaseline} + 2.65 * \text{DBPBaseline} - 3.71 * \text{HRBaseline} \\ &- 4.99 * \text{SBP45} + 2.02 * \text{DBP45} + 3.54 * \text{HR45}\end{aligned}$$

Since only 30.6% variation in blood loss at 60 minutes after birth can be attributed to stock index at 30 minutes after birth, study group, and the predictors in the model, other factors including predictors with ending of -15 and -30 should be taken into consider. Precious health condition should be also considered especially blood disease or cancers, since they influence the blood loss at 60 minutes after birth.

Appendix

```
proc import
DATAFILE = "/home/u59373588/My SAS/week 15/PPH-Oxytocin-RCT.csv" OUT = PPH
DBMS = csv
REPLACE;
GETNAMES = yes;
run;

proc ttest data = PPH alpha=0.05;
Class StudyGroup;
VAR HbPost;
run;
```

Table 3. Statistic of Post Hemoglobin (Hb) levels, mean (SD) in two groups.

The TTEST Procedure

Variable: HbPost

StudyGroup	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
IM		240	10.4046	1.5956	0.1030	5.5000	15.4000
IV		236	10.3597	1.3956	0.0908	5.9000	14.7000
Diff (1-2)	Pooled		0.0448	1.4998	0.1375		
Diff (1-2)	Satterthwaite		0.0448		0.1373		

StudyGroup	Method	Mean	95% CL Mean		Std Dev	95% CL Std Dev	
IM		10.4046	10.2017	10.6075	1.5956	1.4644	1.7527
IV		10.3597	10.1808	10.5387	1.3956	1.2800	1.5343
Diff (1-2)	Pooled	0.0448	-0.2253	0.3150	1.4998	1.4101	1.6017
Diff (1-2)	Satterthwaite	0.0448	-0.2250	0.3147			

Method	Variances	DF	t Value	Pr > |t|
Pooled	Equal	474	0.33	0.7445
Satterthwaite	Unequal	467.66	0.33	0.7442

Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	239	235	1.31	0.0399

```
proc freq data = PPH;
tables StudyGroup * BL500;
run;

proc freq data = PPH;
tables StudyGroup * BL750;
run;

proc freq data = PPH;
tables StudyGroup * BL1000;
run;
```

The FREQ Procedure

Frequency
Percent
Row Pct
Col Pct

Table of StudyGroup by BL500

StudyGroup	BL500 0	BL500 1	Total
IM	182 38.16 76.15 49.06	57 11.95 23.85 53.77	239 50.10
IV	189 39.62 79.41 50.94	49 10.27 20.59 46.23	238 49.90
Total	371 77.78	106 22.22	477 100.00

Frequency Missing = 3

The FREQ Procedure

Frequency
Percent
Row Pct
Col Pct

Table of StudyGroup by BL750

StudyGroup	BL750 0	BL750 1	Total
IM	208 43.61 87.03 48.94	31 6.50 12.97 59.62	239 50.10
IV	217 45.49 91.18 51.06	21 4.40 8.82 40.38	238 49.90
Total	425 89.10	52 10.90	477 100.00

Frequency Missing = 3

The FREQ Procedure

Frequency
Percent
Row Pct
Col Pct

Table of StudyGroup by BL1000

StudyGroup	BL1000 0	BL1000 1	Total
IM	221 46.33 92.47 49.66	18 3.77 7.53 56.25	239 50.10
IV	224 46.96 94.12 50.34	14 2.94 5.88 43.75	238 49.90
Total	445 93.29	32 6.71	477 100.00

Frequency Missing = 3

```
data PPH;
INPUT group $ NumYes Total;
 Bl500="Yes"; Count=NumYes; output;
 Bl500="No"; Count=Total-NumYes; output;
DATALINES;
 IV 49 238
 IM 57 239
 ;
run;
proc freq data=PPH;
WEIGHT Count;
TABLES group*Bl500;
run;
proc format;
VALUE $Bl500data "Yes"="0-Yes" "No"="1-No";
run;
proc freq data=PPH order=formatted;
FORMAT Bl500 $Bl500data.;
WEIGHT Count;
TABLES group*Bl500 / riskdiff relrisk nopercent;
run;
```

The FREQ Procedure

Frequency Row Pct Col Pct	Table of group by Bl500		
	Bl500		
group	0-Yes	1-No	Total
IM	57 23.85 53.77	182 76.15 49.06	239
IV	49 20.59 46.23	189 79.41 50.94	238
Total	106	371	477

Statistics for Table of group by Bl500

Column 1 Risk Estimates						
	Risk	ASE	95% Confidence Limits		Exact 95% Confidence Limits	
Row 1	0.2385	0.0276	0.1845	0.2925	0.1859	0.2977
Row 2	0.2059	0.0262	0.1545	0.2573	0.1564	0.2629
Total	0.2222	0.0190	0.1849	0.2595	0.1857	0.2622
Difference	0.0326	0.0380	-0.0419	0.1072		
Difference is (Row 1 - Row 2)						

Column 2 Risk Estimates						
	Risk	ASE	95% Confidence Limits		Exact 95% Confidence Limits	
Row 1	0.7615	0.0276	0.7075	0.8155	0.7023	0.8141
Row 2	0.7941	0.0262	0.7427	0.8455	0.7371	0.8436
Total	0.7778	0.0190	0.7405	0.8151	0.7378	0.8143
Difference	-0.0326	0.0380	-0.1072	0.0419		
Difference is (Row 1 - Row 2)						

Odds Ratio and Relative Risks			
Statistic	Value	95% Confidence Limits	
Odds Ratio	1.2080	0.7837	1.8620
Relative Risk (Column 1)	1.1584	0.8270	1.6226
Relative Risk (Column 2)	0.9589	0.8711	1.0556

Sample Size = 477

The FREQ Procedure

Frequency Expected Row Pct Col Pct	Table of group by Bl500		
	Bl500		
group	No	Yes	Total
IM	182 185.89 76.15 49.06	57 53.111 23.85 53.77	239
IV	189 185.11 79.41 50.94	49 52.889 20.59 46.23	238
Total	371	106	477

Statistics for Table of group by Bl500

Statistic	DF	Value	Prob
Chi-Square	1	0.7338	0.3917
Likelihood Ratio Chi-Square	1	0.7343	0.3915
Continuity Adj. Chi-Square	1	0.5572	0.4554
Mantel-Haenszel Chi-Square	1	0.7322	0.3922
Phi Coefficient		-0.0392	
Contingency Coefficient		0.0392	
Cramer's V		-0.0392	

Fisher's Exact Test	
Cell (1,1) Frequency (F)	182
Left-sided Pr <= F	0.2278
Right-sided Pr >= F	0.8331
Table Probability (P)	0.0609
Two-sided Pr <= P	0.4410

Sample Size = 477

```
proc freq data=PPH;
WEIGHT Count;
TABLES group*Bl500/ chisq expected nopercent;;
run;
```

```
data PPH;
INPUT group $ NumYes Total;
 Bl750="Yes"; Count=NumYes; output;
 Bl750="No"; Count=Total-NumYes; output;
```

```
DATALINES;
 IV 21 238
 IM 31 239
 ;
run;
proc freq data=PPH;
WEIGHT Count;
TABLES group*Bl750;
run;
proc format;
VALUE $Bl500data "Yes"="0-Yes" "No"="1-No";
run;
proc freq data=PPH order=formatted;
FORMAT Bl750 $Bl750data.;
WEIGHT Count;
TABLES group*Bl750 / riskdiff relrisk nopercent;
run;

proc freq data=PPH;
WEIGHT Count;
TABLES group*Bl750/ chisq expected nopercent;;
run;
```

The FREQ Procedure

Frequency
Expected
Row Pct
Col Pct

Table of group by Bl750

group	Bl750 No	Bl750 Yes	Total
IM	208 212.95 87.03 48.94	31 26.055 12.97 59.62	239
IV	217 212.05 91.18 51.06	21 25.945 8.82 40.38	238
Total	425	52	477

Statistics for Table of group by Bl750

Statistic	DF	Value	Prob
Chi-Square	1	2.1116	0.1462
Likelihood Ratio Chi-Square	1	2.1236	0.1450
Continuity Adj. Chi-Square	1	1.7062	0.1915
Mantel-Haenszel Chi-Square	1	2.1072	0.1466
Phi Coefficient		-0.0665	
Contingency Coefficient		0.0664	
Cramer's V		-0.0665	

Fisher's Exact Test	
Cell (1,1) Frequency (F)	208
Left-sided Pr <= F	0.0955
Right-sided Pr >= F	0.9456
Table Probability (P)	0.0411
Two-sided Pr <= P	0.1857

Sample Size = 477

The FREQ Procedure

Frequency
Row Pct
Col Pct

Table of group by Bl750

group	Bl750 0-Yes	Bl750 1-No	Total
IM	31 12.97 59.62	208 87.03 48.94	239
IV	21 8.82 40.38	217 91.18 51.06	238
Total	52	425	477

Statistics for Table of group by Bl750

Column 1 Risk Estimates

	Risk	ASE	95% Confidence Limits		Exact 95% Confidence Limits	
Row 1	0.1297	0.0217	0.0871	0.1723	0.0899	0.1790
Row 2	0.0882	0.0184	0.0522	0.1243	0.0554	0.1317
Total	0.1090	0.0143	0.0810	0.1370	0.0825	0.1405
Difference	0.0415	0.0285	-0.0143	0.0973		
Difference is (Row 1 - Row 2)						

Column 2 Risk Estimates

	Risk	ASE	95% Confidence Limits		Exact 95% Confidence Limits	
Row 1	0.8703	0.0217	0.8277	0.9129	0.8210	0.9101
Row 2	0.9118	0.0184	0.8757	0.9478	0.8683	0.9446
Total	0.8910	0.0143	0.8630	0.9190	0.8595	0.9175
Difference	-0.0415	0.0285	-0.0973	0.0143		
Difference is (Row 1 - Row 2)						

Odds Ratio and Relative Risks		
Statistic	Value	95% Confidence Limits
Odds Ratio	1.5401	0.8574 2.7663
Relative Risk (Column 1)	1.4700	0.8704 2.4826
Relative Risk (Column 2)	0.9545	0.8963 1.0165

Sample Size = 477

```
data PPH;
INPUT group $ NumYes Total;
 Bl1000="Yes"; Count=NumYes; output;
 Bl1000="No"; Count=Total-NumYes; output;
DATALINES;
 IV 14 238
 IM 18 239
 ;
run;
proc freq data=PPH;
```

```
WEIGHT Count;
TABLES group*Bl1000;
run;
proc format;
VALUE $Bl1000data "Yes"="0-Yes" "No"="1-No";
run;
proc freq data=PPH order=formatted;
FORMAT Bl1000 $Bl1000data.;
WEIGHT Count;
TABLES group*Bl1000 / riskdiff relrisk nopercent;
run;

proc freq data=PPH;
WEIGHT Count;
TABLES group*Bl1000/ chisq expected nopercent;;
run;
```

The FREQ Procedure

Frequency
Row Pct
Col Pct

Table of group by Bl1000			
	Bl1000		
group	0-Yes	1-No	Total
IM	18 7.53 56.25	221 92.47 49.66	239
IV	14 5.88 43.75	224 94.12 50.34	238
Total	32	445	477

Statistics for Table of group by Bl1000

Column 1 Risk Estimates						
	Risk	ASE	95% Confidence Limits		Exact 95% Confidence Limits	
Row 1	0.0753	0.0171	0.0419	0.1088	0.0452	0.1164
Row 2	0.0588	0.0153	0.0289	0.0887	0.0325	0.0967
Total	0.0671	0.0115	0.0446	0.0895	0.0463	0.0934
Difference	0.0165	0.0229	-0.0284	0.0614		
Difference is (Row 1 - Row 2)						

Column 2 Risk Estimates						
	Risk	ASE	95% Confidence Limits		Exact 95% Confidence Limits	
Row 1	0.9247	0.0171	0.8912	0.9581	0.8836	0.9548
Row 2	0.9412	0.0153	0.9113	0.9711	0.9033	0.9675
Total	0.9329	0.0115	0.9105	0.9554	0.9066	0.9537
Difference	-0.0165	0.0229	-0.0614	0.0284		
Difference is (Row 1 - Row 2)						

Odds Ratio and Relative Risks			
Statistic	Value	95% Confidence Limits	
Odds Ratio	1.3032	0.6326	2.6846
Relative Risk (Column 1)	1.2803	0.6519	2.5146
Relative Risk (Column 2)	0.9825	0.9363	1.0309

Sample Size = 477

The FREQ Procedure

Frequency
Expected
Row Pct
Col Pct

Table of group by Bl1000			
	Bl1000		
group	No	Yes	Total
IM	221 222.97 92.47 49.66	18 16.034 7.53 56.25	239
IV	224 222.03 94.12 50.34	14 15.966 5.88 43.75	238
Total	445	32	477

Statistics for Table of group by Bl1000

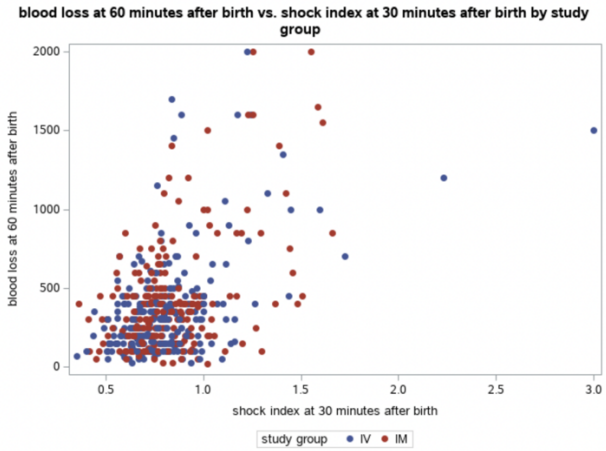
Statistic	DF	Value	Prob
Chi-Square	1	0.5181	0.4716
Likelihood Ratio Chi-Square	1	0.5194	0.4711
Continuity Adj. Chi-Square	1	0.2881	0.5914
Mantel-Haenszel Chi-Square	1	0.5170	0.4721
Phi Coefficient		-0.0330	
Contingency Coefficient		0.0329	
Cramer's V		-0.0330	

Fisher's Exact Test	
Cell (1,1) Frequency (F)	221
Left-sided Pr <= F	0.2961
Right-sided Pr >= F	0.8166
Table Probability (P)	0.1126
Two-sided Pr <= P	0.5836

Sample Size = 477

```
proc import
DATAFILE = "/home/u59373588/My SAS/week 15/PPH-Oxytocin-RCT.csv" OUT = PPH
DBMS = csv
REPLACE;
GETNAMES = yes;
run;

DATA PPH;
SET PPH;
SI30 = HR30/SBP30;
```

```
run;


proc sgplot data = PPH;
 SCATTER x = SI30 y = BloodLoss60 / group=StudyGroup markerattrs=(symbol=CircleFilled);
 XAXIS label = "shock index at 30 minutes after birth";
 YAXIS label = "blood loss at 60 minutes after birth";
 TITLE "blood loss at 60 minutes after birth vs. shock index at 30 minutes after birth by study group";
 KEYLEGEND  / title="study group";
run;

data PPH;
SET PPH;
IF StudyGroup="IV" THEN IV=1;
ELSE IV=0;
run;

proc reg data= PPH;
MODEL BloodLoss60 = SI30 IV;
run;
```



blood loss at 60 minutes after birth vs. shock index at 30 minutes after birth by study group

The REG Procedure
Model: MODEL1
Dependent Variable: BloodLoss60

Number of Observations Read	480
Number of Observations Used	476
Number of Observations with Missing Values	4

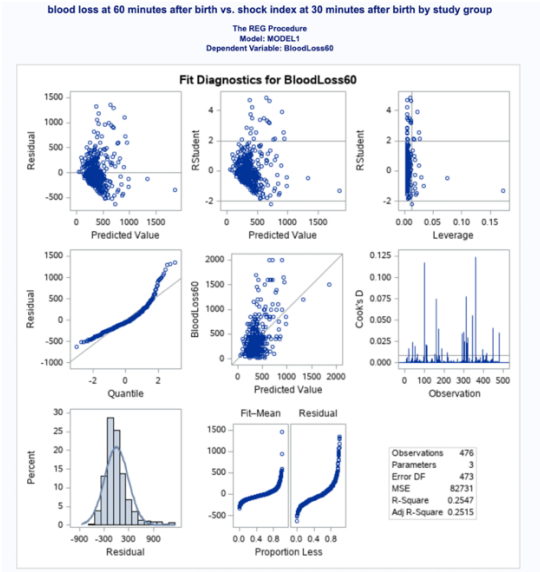
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	13369786	6684893	80.80	<.0001
Error	473	39131826	82731		
Corrected Total	475	52501612			

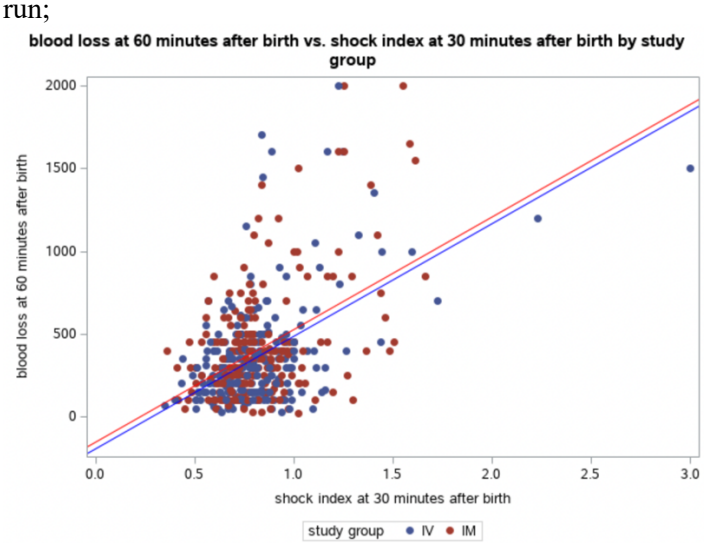
Root MSE	287.63020	R-Square	0.2547
Dependent Mean	382.66807	Adj R-Sq	0.2515
Coeff Var	75.16441		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-151.07932	47.82788	-3.16	0.0017
SI30	1	679.19165	53.88242	12.61	<.0001
IV	1	-37.57475	26.37139	-1.42	0.1549



```
proc sgplot data=PPH;
 SCATTER x = SI30 y = BloodLoss60 / group=StudyGroup markerattrs=(symbol=CircleFilled);
 XAXIS label = "shock index at 30 minutes after birth";
 YAXIS label = "blood loss at 60 minutes after birth";
 TITLE "blood loss at 60 minutes after birth vs. shock index at 30 minutes after birth by study group";
 KEYLEGEND  / title="study group";
 LINEPARM x=0 y=-188.65 slope= 679.19 / lineattrs=(color=blue);
 LINEPARM x=0 y=-151.08 slope= 679.19 / lineattrs=(color=red);
run;
```




```
proc reg data=PPH plots(maxpoints=none);
        model BloodLoss60 = SI30 IV/ clb alpha=0.05;
run;
```

blood loss at 60 minutes after birth vs. shock index at 30 minutes after birth by study group

The REG Procedure
Model: MODEL1
Dependent Variable: BloodLoss60

Number of Observations Read	480
Number of Observations Used	476
Number of Observations with Missing Values	4

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	13369786	6684893	80.80	<.0001
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Root MSE	287.63020	R-Square	0.2547
Dependent Mean	382.66807	Adj R-Sq	0.2515
Coeff Var	75.16441		

Parameter Estimates							
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	95% Confidence Limits	
Intercept	1	-151.07932	47.82788	-3.16	0.0017	-245.06071	-57.09792
SI30	1	679.19165	53.88242	12.61	<.0001	573.31313	785.07017
IV	1	-37.57475	26.37139	-1.42	0.1549	-89.39432	14.24483

```
proc import
DATAFILE = "/home/u59373588/My SAS/week 15/PPH-Oxytocin-RCT.csv" OUT = PPH
DBMS = csv
REPLACE;
GETNAMES = yes;
run;

DATA PPH;
SET PPH;
SI30 = HR30/SBP30;
run;

data PPH;
SET PPH;
IF StudyGroup="IV" THEN IV=1;
ELSE IV=0;
run;

proc reg data= PPH plots(maxpoints=none);
MODEL BloodLoss60 = SI30 IV Age NumPregnancies;
run;
```

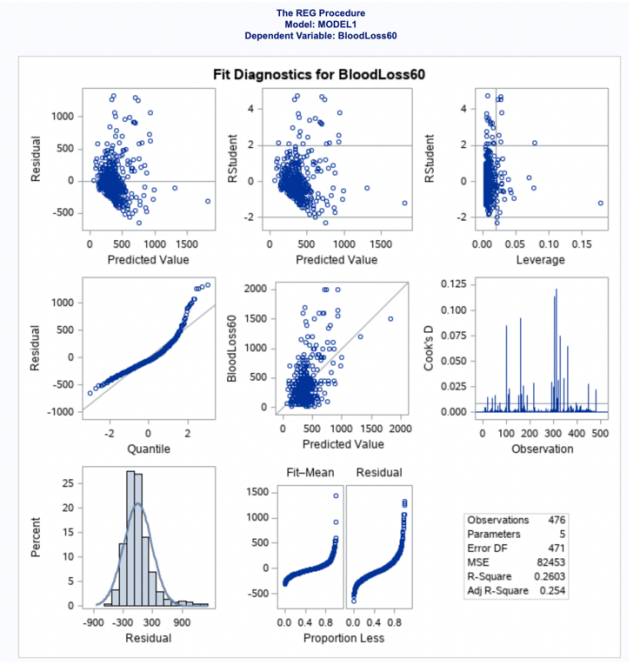
The REG Procedure
Model: MODEL1
Dependent Variable: BloodLoss60

Number of Observations Read	480
Number of Observations Used	476
Number of Observations with Missing Values	4

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	13666280	3416570	41.44	<.0001
Error	471	38835332	82453		
Corrected Total	475	52501612			

Root MSE	287.14619	R-Square	0.2603
Dependent Mean	382.66807	Adj R-Sq	0.2540
Coeff Var	75.03793		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-199.37956	84.99628	-2.35	0.0194
SI30	1	663.50651	55.76587	11.90	<.0001
IV	1	-38.89004	26.34370	-1.48	0.1405
Age	1	4.50270	3.18402	1.41	0.1580
NumPregnancies	1	-19.92749	10.64134	-1.87	0.0617




```
proc import
DATAFILE = "/home/u59373588/My SAS/week 15/PPH-Oxytocin-RCT.csv" OUT = PPH
DBMS = csv
REPLACE;
GETNAMES = yes;
run;

DATA PPH;
SET PPH;
SI30 = HR30/SBP30;
run;

data PPH;
SET PPH;
IF StudyGroup="IV" THEN IV=1;
ELSE IV=0;
run;

proc reg data= PPH plots(maxpoints=none);
MODEL BloodLoss60 = SI30 IV HbBaseline SBPBaseline DBPBaseline HRBaseline;
run;
```

The REG Procedure
Model: MODEL1
Dependent Variable: BloodLoss60

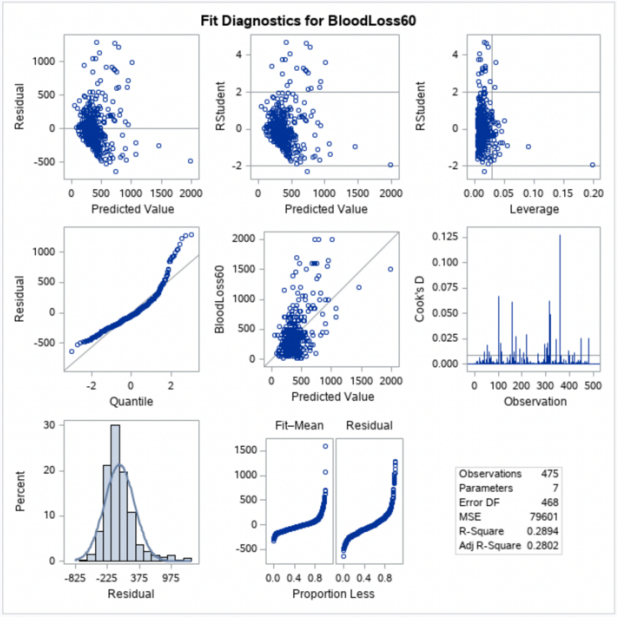
Number of Observations Read	480
Number of Observations Used	475
Number of Observations with Missing Values	5

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	15168386	2528064	31.76	<.0001
Error	468	37253156	79601		
Corrected Total	474	52421542			

Root MSE	282.13607	R-Square	0.2894
Dependent Mean	383.26316	Adj R-Sq	0.2802
Coeff Var	73.61419		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-169.56619	180.75131	-0.94	0.3487
SI30	1	754.15291	55.36307	13.62	<.0001
IV	1	-37.26822	25.91718	-1.44	0.1511
HbBaseline	1	-12.63384	8.71183	-1.45	0.1477
SBPBaseline	1	1.59796	1.36184	1.17	0.2412
DBPBaseline	1	2.62953	1.67322	1.57	0.1167
HRBaseline	1	-3.25775	1.00851	-3.23	0.0013

The REG Procedure
Model: MODEL1
Dependent Variable: BloodLoss60



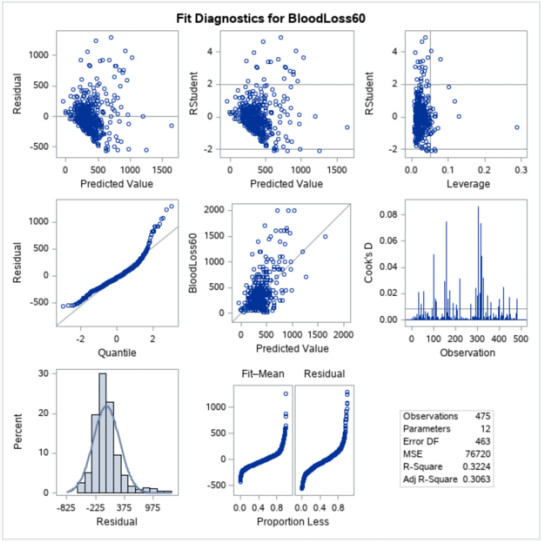

```
proc import
DATAFILE = "/home/u59373588/My SAS/week 15/PPH-Oxytocin-RCT.csv" OUT = PPH
DBMS = csv
REPLACE;
GETNAMES = yes;
run;

DATA PPH;
SET PPH;
SI30 = HR30/SBP30;
run;

data PPH;
SET PPH;
IF StudyGroup="IV" THEN IV=1;
ELSE IV=0;
run;

proc reg data= PPH plots(maxpoints=none);
MODEL BloodLoss60 = SI30 IV Age TotalChildren HbBaseline SBPBaseline DBPBaseline HRBaseline
SBP45 DBP45 HR45;
run;
```

The REG Procedure
Model: MODEL1
Dependent Variable: BloodLoss60

Number of Observations Read	480
Number of Observations Used	475
Number of Observations with Missing Values	5

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	16900048	1536368	20.03	<.0001
Error	463	35521494	76720		
Corrected Total	474	52421542			

Root MSE	276.98428	R-Square	0.3224
Dependent Mean	383.26316	Adj R-Sq	0.3063
Coeff Var	72.27000		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	116.55871	219.47449	0.53	0.5956
SI30	1	464.72029	87.73822	5.30	<.0001
IV	1	-40.51400	25.50385	-1.59	0.1128
Age	1	2.34206	3.07835	0.76	0.4472
TotalChildren	1	-8.38575	11.38556	-0.74	0.4618
HbBaseline	1	-12.51749	8.64078	-1.45	0.1481
SBPBaseline	1	1.93791	1.38609	1.40	0.1627
DBPBaseline	1	2.64553	1.69035	1.57	0.1182
HRBaseline	1	-3.71415	1.04148	-3.57	0.0004
SBP45	1	-4.98707	1.55648	-3.20	0.0014
DBP45	1	2.02376	1.93508	1.05	0.2962
HR45	1	3.54135	1.13266	3.13	0.0019

The REG Procedure
Model: MODEL1
Dependent Variable: BloodLoss60