



Bharatiya Vidya Bhavan's
Sardar Patel Institute of Technology
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

Name	Sahil Patil
UID	2019110042

Aim	To perform Exploratory Data Analysis using SAS.
------------	---

Code

```
LIBNAME Pharma_D "ignore this part";

PROC IMPORT OUT=mydata
    DATAFILE= "/home/u62322971/PharmaDemo.xls"
    DBMS=XLS REPLACE;
    GETNAMES=YES;
    SHEET=csv;
    DATAROW=2;
RUN;

* Save the output to a rtf file;

ODS RTF FILE='/home/rwomack0/Pharma_demo/PharmaDemo.rtf';

* Print the data set;
PROC PRINT DATA=mydata;
RUN;

* Show the variables list;
PROC CONTENTS DATA=mydata;
RUN;

* Drop and rename variables, create a new data set, label and transform variables;

DATA my_new_data REPLACE;
    SET mydata;
    DROP Painkiller;
    LABEL Tot_Opi=Total Opiate Use Opi N T=Opiate Naive/Tolerant TOT LOS H=Length of
Hospital Stay;
RUN;
```



Bharatiya Vidya Bhavan's
Sardar Patel Institute of Technology
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

```
DATA my_new_data REPLACE;
  SET my_new_data;
  RENAME Tot_Opi=Total_Opiate_Use Average_Pain_Score=Avg_Pain;
RUN;

DATA my_new_data REPLACE;
  SET my_new_data;
  Hourly_Dose=(Total_Opiate_Use/TOT_LOS_H);
RUN;

PROC CONTENTS DATA=my_new_data;
RUN;

* Calculate descriptive statistics;
PROC UNIVARIATE DATA=my_new_data;
  VAR Total_Opiate_Use TOT_LOS_H;
RUN;

* Compare basic descriptive statistics among groups;
PROC MEANS DATA=my_new_data;
  CLASS IV_APAP;
  VAR Total_Opiate_Use TOT_LOS_H;
RUN;

* Categorical data frequencies;
* must SORT before using BY option;

PROC SORT DATA=my_new_data;
  BY IV_APAP;
RUN;

* Chi-squared test;
* This tests for equality, but you can also specify expected proportions in each cell;
PROC FREQ DATA=my_new_data;
  TABLES IV_APAP*Epidural / chisq measures;
RUN;

PROC FREQ DATA=my_new_data;
  TABLES IV_APAP*Opi_N_T / chisq measures;
RUN;

PROC FREQ DATA=my_new_data;
  TABLES IV_APAP*Tramadol / chisq measures;
RUN;

* Check normality with PROC UNIVARIATE;
PROC UNIVARIATE DATA=my_new_data NORMAL;
```



Bharatiya Vidya Bhavan's
Sardar Patel Institute of Technology
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

```
VAR Weight;
QQPLOT;
PROBPLOT;

* T-test, compare groups;
PROC TTEST DATA=my_new_data;
CLASS IV_APAP;
VAR Weight;

PROC TTEST DATA=my_new_data;
CLASS IV_APAP;
VAR Avg Pain;

PROC TTEST DATA=my_new_data;
CLASS IV_APAP;
VAR Tot Opiate Use;

PROC TTEST DATA=my_new_data;
CLASS IV_APAP;
VAR TOT LOS H;

* T-test, one sample;
PROC TTEST DATA=my_new_data H0=70 PLOTS(showh0) SIDES=u ALPHA=0.1;
VAR TOT LOS H;

* Side-by-side boxplots;
* First, sort the data;
PROC SORT DATA=my_new_data;
BY Epidural;
RUN;

** Draw the plots;
PROC SGPlot DATA=my_new_data;
VBOX Tot Opiate Use / CATEGORY=Epidural;
RUN;

* Correlation between two variables;

PROC CORR DATA=my_new_data;
VAR Tot Opiate Use Avg Pain;
RUN;

* Scatter plot;

PROC SGPlot DATA=my_new_data;
SCATTER X=Avg Pain Y=Tot Opiate Use;
```



**Bharatiya Vidya Bhavan's
Sardar Patel Institute of Technology**

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

RUN;

```
* Regression;  
* Use QUIT statement to clear any stored variables from the regression;
```

```
** Model: Tot_Opiate_Use = Avg_Pain;  
PROC REG DATA=my_new_data; [REDACTED]  
  MODEL Tot_Opiate_Use = Avg_Pain;  
RUN; [REDACTED]  
QUIT;
```

```
** Model: Tot_Opiate_Use = Avg_Pain + Epidural;
```

```
*Recode Epidural first;  
DATA my_new_data REPLACE;  
  SET my_new_data;  
  Epidural2 = .; [REDACTED]  
  IF (Epidural="Yes") THEN Epidural2 = 1;  
  IF (Epidural="No") THEN Epidural2 = 0;  
RUN; [REDACTED]
```

```
PROC REG DATA=my_new_data;  
  MODEL Tot_Opiate_Use = Avg_Pain Epidural2;  
RUN; [REDACTED]  
QUIT;
```

```
** Logistic Regression with PROC LOGISTIC;  
PROC LOGISTIC DATA=my_new_data Descending;  
  MODEL IV_APAP = Avg_Pain Weight;  
RUN; [REDACTED]  
QUIT;
```

```
* Save the data file to a SAS data file on local drive;  
DATA '/home/rwomack0/Pharma_demo/Pharma_Demo' REPLACE;  
  SET my_new_data;  
RUN;
```

```
*close out the document recording the session;  
ODS RTF CLOSE; [REDACTED]
```

Obs	Age	Gender	Weight	IV_APAP	Epidural	Opi_N_T	Average_Pain_Score	Tot_Opi	Tramadol	TOT_LOS_H	Painkiller	
1	51	F	129.55	1	Yes	Yes		15	35	No	78.18	Acetaminophen
2	76	M	78.18	1	Yes	Naive		7	10	Yes	124.53	Aspirin
3	66	F	108.63	1	Yes	Naive		6	85	No	174.3	Ibuprofen
4	70	F	120.97	1	Yes	Tolerant		4	54.5	No	58.02	Acetaminophen
5	62	F	108.38	1	Yes	Naive		2	49.67	No	53.68	Aspirin
6	58	F	78.69	1	Yes	Naive		0	12.67	No	54.52	Ibuprofen
7	57	M	103.64	1	Yes	Naive		12	110.5	No	80.03	Acetaminophen
8	85	M	72.73	1	Yes	Naive		5	20.83	Yes	104.65	Aspirin
9	50	F	107.27	1	Yes	Naive		10	122.67	No	73.73	Ibuprofen
10	71	M	123.75	1	Yes	Tolerant		8	88	No	72.3	Acetaminophen
11	73	F	93.18	1	Yes	Naive		10	30	Yes	78.37	Aspirin
12	64	F	111.99	1	Yes	Tolerant		0	14.17	No	56.08	Ibuprofen
13	57	F	81.36	1	Yes	Naive		2	30	No	53.2	Acetaminophen
14	56	F	105.45	1	Yes	Naive		3	92.13	No	52.17	Aspirin
15	70	F	61.36	1	Yes	Tolerant		9	51	No	78.83	Ibuprofen
16	77	F	80	1	Yes	Naive		1	25.5	No	54.62	Acetaminophen
17	66	F	58.35	1	Yes	Naive		4	0	No	77.32	Aspirin
18	77	F	65.45	1	Yes	Naive		2	5	Yes	75.1	Ibuprofen
19	59	F	118.18	1	Yes	Tolerant		16	90.67	No	79.77	Acetaminophen
20	75	F	59.32	1	Yes	Naive		9	12.5	No	81.35	Aspirin
21	78	F	102.95	1	Yes	Naive		4	7.67	Yes	78.62	Ibuprofen
22	66	M	143.18	1	Yes	Naive		19	26.67	No	395.03	Acetaminophen
23	64	F	62.73	1	Yes	Tolerant		3	66.67	No	55.2	Aspirin
24	48	M	126.82	1	Yes	Naive		2	18	No	55.17	Ibuprofen
25	46	F	116.59	1	Yes	Naive		5	61.67	No	58	Acetaminophen
26	63	M	87.27	1	Yes	Naive		3	30.67	No	56.27	Aspirin
27	64	F	63.63	1	Yes	Tolerant		3	16	No	80	Ibuprofen
28	77	M	68.4	1	Yes	Naive		0	4.67	No	55.78	Acetaminophen
29	63	M	95.48	1	Yes	Naive		8	12.5	No	149.97	Aspirin
30	78	M	67.73	1	Yes	Naive		11	5	Yes	128.95	Ibuprofen
31	63	F	78.64	1	Yes	Naive		1	65.33	No	56.03	Acetaminophen
32	64	M	102.27	1	Yes	Naive		4	23.33	No	57.03	Aspirin
33	51	F	74.09	1	Yes	Naive		9	36.33	No	80.78	Ibuprofen
34	65	F	53.64	1	Yes	Tolerant		11	40.5	No	102.8	Acetaminophen
35	64	F	87.39	1	No	Tolerant		10	74.67	No	84.03	Aspirin
36	84	M	84.09	1	Yes	Naive		5	0	Yes	77.88	Ibuprofen
37	74	F	92.27	1	Yes	Naive		0	19	No	53.68	Acetaminophen
38	50	F	90.91	1	Yes	Tolerant		13	75.08	No	78.57	Aspirin
39	53	F	82.44	1	Yes	Tolerant		2	24	No	52.35	Ibuprofen
40	78	F	44.55	1	Yes	Tolerant		6	0	Yes	106.5	Acetaminophen
41	86	F	61.82	1	Yes	Naive		3	18	No	81.67	Aspirin
42	78	M	77.77	1	Yes	Naive		7	25	No	80.55	Ibuprofen
43	61	M	111.36	1	Yes	Naive		3	15	No	55.98	Acetaminophen
44	74	M	87.27	1	Yes	Naive		2	25.83	No	53.35	Aspirin
45	67	F	97.73	1	Yes	Naive		1	32.83	No	55.48	Ibuprofen
46	60	F	79.55	1	Yes	Naive		1	50.33	No	52.53	Acetaminophen
47	81	F	66.82	1	Yes	Tolerant		10	88	Yes	74.73	Aspirin
48	79	F	93.89	1	Yes	Naive		0	3.33	Yes	50.67	Ibuprofen
49	72	F	92.05	1	Yes	Naive		5	30	No	58.1	Acetaminophen
50	56	M	103.35	1	Yes	Tolerant		10	72.5	No	76.48	Aspirin
51	58	M	117.27	0	Yes	Naive		6	28.33	No	81.3	Ibuprofen
52	85	F	74.09	0	Yes	Naive		3	8.33	Yes	56.42	Acetaminophen
53	57	F	91.82	0	Yes	Tolerant		2	34.17	No	55.15	Aspirin

Obs	Age	Gender	Weight	IV_APAP	Epidural	Opi_N_T	Average_Pain_Score	Tot_Opi	Tramadol	TOT_LOS_H	Painkiller
54	58	F	60.45	0	Yes	Naive	7	35	No	80.97	Ibuprofen
55	56	M	123.36	0	Yes	Naive	2	35	No	54.18	Acetaminophen
56	79	M	96.82	0	Yes	Tolerant	5	11.33	Yes	78.73	Aspirin
57	59	M	96.82	0	Yes	Tolerant	10	8.33	Yes	79.82	Ibuprofen
58	56	F	70	0	Yes	Naive	12	54	No	81.18	Acetaminophen
59	56	M	105.45	0	No	Naive	2	25	No	62.05	Aspirin
60	67	F	92.73	0	Yes	Naive	0	17.5	No	54.37	Ibuprofen
61	56	F	97.27	0	Yes	Naive	9	43.33	No	79.58	Acetaminophen
62	66	F	72.27	0	Yes	Naive	0	15	No	55.25	Aspirin
63	70	M	121.86	0	Yes	Tolerant	8	51.98	Yes	74.47	Ibuprofen
64	71	F	84.55	0	Yes	Naive	7	15.17	Yes	79.07	Acetaminophen
65	66	M	97.73	0	Yes	Tolerant	1	6.66	No	54.82	Aspirin
66	65	F	71.82	0	Yes	Naive	4	43.34	No	57.83	Ibuprofen
67	72	M	91.91	0	Yes	Naive	10	7.66	Yes	76.92	Acetaminophen
68	67	F	101.93	0	Yes	Naive	8	47.49	No	77.72	Aspirin
69	61	F	86.55	0	Yes	Tolerant	3	19.99	No	56.55	Ibuprofen
70	70	F	112.27	0	Yes	Naive	11	58.34	No	80.05	Acetaminophen
71	64	M	127	0	Yes	Naive	0	15	No	55.6	Aspirin
72	74	M	70.51	0	Yes	Naive	0	0	Yes	77.32	Ibuprofen
73	78	F	82.73	0	Yes	Naive	10	10	Yes	72.07	Acetaminophen
74	67	F	92.73	0	Yes	Naive	3	32.5	No	56.48	Aspirin
75	69	M	101.36	0	Yes	Naive	0	7.5	No	53.7	Ibuprofen
76	74	F	75	0	Yes	Naive	4	7.5	No	80.28	Acetaminophen
77	86	F	60.91	0	No	Naive	0	0	Yes	56.22	Aspirin
78	70	M	76.36	0	No	Naive	0	7.5	No	55.23	Ibuprofen
79	81	F	108.18	0	No	Tolerant	11	10	Yes	76.38	Acetaminophen
80	48	M	116	0	No	Naive	2	55	Yes	54.25	Aspirin
81	54	M	74.55	0	No	Naive	10	52.5	Yes	81.18	Ibuprofen
82	84	F	82.73	0	No	Naive	2	0	Yes	79.28	Acetaminophen
83	65	F	72.55	0	Yes	Tolerant	7	227.5	No	78.55	Aspirin
84	69	M	117.55	0	No	Naive	5	21.66	No	78.45	Ibuprofen
85	69	M	96.64	0	Yes	Naive	5	5	Yes	78.7	Acetaminophen
86	67	F	71.55	0	No	Naive	9	58.83	No	74.65	Aspirin
87	75	F	81.36	0	No	Naive	0	15	No	51.08	Ibuprofen
88	54	M	92.73	0	No	Naive	10	41.33	No	77.63	Acetaminophen
89	69	M	110	0	No	Naive	1	10	No	52.87	Aspirin
90	72	F	88.09	0	Yes	Naive	7	25.83	No	82.32	Ibuprofen
91	51	F	54.55	0	Yes	Naive	1	48.33	No	54.37	Acetaminophen
92	66	M	90	0	Yes	Naive	0	13.33	Yes	55.68	Aspirin
93	80	F	70.82	0	Yes	Naive	1	0	Yes	55.62	Ibuprofen
94	60	M	130	0	Yes	Naive	0	16.67	No	54.15	Acetaminophen
95	55	M	138.45	0	Yes	Tolerant	0	36.67	No	55.23	Aspirin
96	89	M	75.64	0	No	Naive	5	7.67	Yes	78.57	Ibuprofen
97	80	F	70	0	Yes	Tolerant	3	9.17	Yes	153.23	Acetaminophen
98	59	M	111.27	0	Yes	Naive	2	30	No	58.17	Aspirin
99	64	F	79.45	0	Yes	Naive	2	41.67	No	57.05	Ibuprofen
100	68	M	100	0	Yes	Naive	1	33	No	55.2	Acetaminophen
101	44	M	97.41	1	Yes	Naive	0	46.66	No	55.33	Aspirin
102	61	F	93.18	1	Yes	Tolerant	4	54.17	No	124.87	Ibuprofen
103	66	F	67.27	1	Yes	Naive	1	156.99	No	53.87	Acetaminophen
104	43	M	102.27	1	Yes	Tolerant	3	54.17	No	56.5	Aspirin
105	75	F	68.18	1	Yes	Naive	3	26.67	No	55.55	Ibuprofen
106	74	F	90	1	Yes	Tolerant	7	50.66	No	80.63	Acetaminophen
107	64	F	117.27	1	Yes	Naive	9	38.67	No	80.8	Aspirin

Obs	Age	Gender	Weight	IV_APAP	Epidural	Opi_N_T	Average_Pain_Score	Tot_Opi	Tramadol	TOT_LOS_H	Painkiller
108	81	F	84.55	1	Yes	Naive	7	6.17	Yes	82.88	Ibuprofen
109	67	F	68.64	1	Yes	Naive	2	42.13	No	72.58	Acetaminophen
110	79	M	95.91	1	Yes	Naive	2	0	Yes	80.68	Aspirin
111	67	F	77.27	1	Yes	Tolerant	5	5.33	Yes	126.57	Ibuprofen
112	62	F	91.36	1	Yes	Naive	0	22.5	No	55.63	Acetaminophen
113	60	M	105.91	1	Yes	Tolerant	3	59.17	No	54.92	Aspirin
114	60	M	107.73	1	Yes	Naive	0	5	No	51.63	Ibuprofen
115	76	M	95.45	1	Yes	Naive	11	43.34	No	75.73	Acetaminophen
116	56	M	86.36	1	Yes	Tolerant	7	66.17	No	79.88	Aspirin
117	67	F	88.64	1	Yes	Naive	6	53.23	No	79.67	Ibuprofen
118	71	F	83.18	1	Yes	Naive	2	43.67	No	55.23	Acetaminophen
119	62	M	166.02	1	No	Naive	5	58.33	No	78.38	Aspirin
120	77	M	85.91	1	Yes	Naive	7	38	No	99.92	Ibuprofen
121	48	M	100	1	Yes	Naive	0	73	No	57.67	Acetaminophen
122	58	M	120.91	1	Yes	Naive	0	75	No	53.5	Aspirin
123	65	M	96.59	1	No	Naive	5	29.68	No	53.08	Ibuprofen
124	60	F	69.55	1	Yes	Naive	0	41.66	No	54.15	Acetaminophen
125	78	M	69.09	1	Yes	Naive	8	17.17	No	77.25	Aspirin
126	68	M	100	0	Yes	Naive	1	33	No	55.2	Ibuprofen
127	43	F	83.18	0	Yes	Tolerant	7	76.67	Yes	79.98	Acetaminophen
128	50	F	72.73	0	Yes	Naive	3	20.5	No	57.97	Aspirin
129	53	F	107.73	0	Yes	Naive	1	35	No	53.73	Ibuprofen
130	77	F	89.45	0	Yes	Naive	8	25	No	77.7	Acetaminophen
131	71	F	73.9	0	Yes	Naive	1	36.33	No	54	Aspirin
132	53	F	93.82	0	Yes	Naive	0	12.5	No	55.98	Ibuprofen
133	74	F	71.36	0	Yes	Tolerant	0	36.67	No	54.87	Acetaminophen
134	62	F	106	0	Yes	Naive	1	20	No	50.58	Aspirin
135	65	F	72.77	0	Yes	Naive	0	23.33	No	54.07	Ibuprofen
136	76	M	81.82	0	No	Naive	0	15	No	56.47	Acetaminophen
137	65	F	61.09	0	No	Naive	1	26.25	No	55.05	Aspirin
138	79	F	88.18	0	No	Naive	0	10	No	57.32	Ibuprofen
139	70	M	105.91	0	No	Tolerant	0	30	No	56.07	Acetaminophen
140	64	M	130.45	0	No	Tolerant	0	41.67	No	52.23	Aspirin
141	75	F	76.64	0	No	Naive	3	7.5	Yes	149.85	Ibuprofen
142	76	F	47.09	0	Yes	Naive	0	5	No	56.98	Acetaminophen
143	67	F	95	0	Yes	Tolerant	0	35	No	52.88	Aspirin
144	66	M	103.64	0	Yes	Naive	0	15	No	54.6	Ibuprofen
145	65	M	125	0	No	Naive	10	5	No	73.93	Acetaminophen
146	60	M	101.18	0	No	Naive	0	41.33	No	51.15	Aspirin
147	67	F	101.55	0	No	Naive	11	97.5	No	76.73	Ibuprofen
148	61	F	94.82	0	No	Naive	1	51.67	No	57	Acetaminophen
149	57	M	129.55	0	No	Naive	0	66.67	No	54.33	Aspirin
150	73	F	81.14	0	Yes	Naive	0	25	No	56.08	Ibuprofen
151	54	F	83.75	1	Yes	Naive	3	72.33	No	58.33	Acetaminophen
152	57	F	99.55	1	Yes	Naive	2	19.67	No	53.17	Aspirin
153	68	F	64.09	1	Yes	Naive	8	44	No	73.9	Ibuprofen
154	65	M	95.45	1	Yes	Naive	10	78	No	82.78	Acetaminophen
155	66	F	99.55	1	Yes	Naive	2	46.33	No	55.48	Aspirin
156	75	F	64.55	1	Yes	Naive	2	19.16	No	54.48	Ibuprofen
157	67	M	118.18	1	Yes	Tolerant	0	42	No	52.88	Acetaminophen
158	68	F	68.64	1	Yes	Naive	5	48.67	Yes	79.3	Aspirin
159	56	F	102.44	1	Yes	Naive	2	40.66	No	53.9	Ibuprofen
160	82	F	69.55	1	Yes	Naive	4	40.33	No	79.55	Acetaminophen
161	65	M	101.36	1	Yes	Naive	0	18.67	No	53.88	Aspirin

Obs	Age	Gender	Weight	IV_APAP	Epidural	Opi_N_T	Average_Pain_Score	Tot_Opi	Tramadol	TOT_LOS_H	Painkiller
162	60	M	92.39	1	Yes	Naive	8	87.5	No	80.37	Ibuprofen
163	44	M	89.55	1	Yes	Naive	15	69.01	No	76.18	Aspirin
164	76	F	72.27	1	Yes	Naive	0	24.66	No	50.48	Ibuprofen
165	71	F	78.18	1	Yes	Naive	0	38	No	57.68	Acetaminophen
166	69	F	61.36	1	Yes	Naive	0	13	No	48.62	Aspirin
167	88	F	62.5	1	Yes	Naive	1	5.99	Yes	51.67	Ibuprofen
168	69	M	104.32	1	Yes	Naive	4	10	No	54.83	Acetaminophen
169	74	M	96.53	1	Yes	Naive	0	13.33	No	53.55	Aspirin
170	62	F	68.78	1	Yes	Naive	1	73.34	No	51.78	Ibuprofen
171	63	M	100	1	Yes	Tolerant	0	92	No	52.47	Aspirin
172	73	M	72.27	1	Yes	Naive	0	1.67	No	50.63	Ibuprofen
173	66	M	121.82	1	Yes	Naive	3	20.83	No	53.17	Acetaminophen
174	56	M	76.99	1	Yes	Tolerant	12	205.84	No	100.12	Aspirin
175	51	M	106.82	1	Yes	Naive	3	54	No	53.18	Ibuprofen
176	63	M	113.27	0	Yes	Naive	0	20	No	54.32	Acetaminophen
177	60	M	81.82	0	No	Tolerant	0	25	No	51.57	Aspirin
178	64	F	130.91	0	No	Naive	2	74.66	No	56.12	Ibuprofen
179	78	F	81.82	0	No	Naive	1	18.83	No	79.23	Aspirin
180	66	F	103.64	0	No	Naive	2	30	No	56.62	Ibuprofen
181	70	M	103.82	0	No	Tolerant	2	45.17	No	54.05	Acetaminophen
182	77	F	64.93	0	No	Naive	9	48	Yes	126.22	Aspirin
183	80	F	82.73	0	No	Naive	2	26.33	Yes	55.3	Ibuprofen
184	56	F	116.82	0	No	Naive	0	62.67	No	55.52	Acetaminophen
185	65	F	98.64	0	No	Naive	2	42.5	No	55.33	Aspirin
186	59	F	117.91	0	No	Naive	8	61.67	No	80.48	Ibuprofen
187	74	F	101.36	0	No	Naive	7	30	No	81.7	Aspirin
188	50	F	110.73	0	No	Naive	2	52.83	No	55.9	Ibuprofen
189	64	F	88.64	0	No	Naive	0	40	No	51.72	Acetaminophen
190	79	F	104.64	0	No	Naive	3	1.33	Yes	77.03	Aspirin
191	64	F	79.45	0	No	Naive	2	35	No	59.28	Ibuprofen
192	53	M	111.27	0	No	Tolerant	0	89.17	No	53.22	Acetaminophen
193	46	F	139.73	0	No	Tolerant	2	11.67	No	56.42	Aspirin
194	57	F	61.82	0	No	Tolerant	2	18.67	No	59.83	Ibuprofen
195	75	F	80	0	No	Naive	10	28.33	Yes	78.62	Aspirin
196	77	F	56.91	0	No	Tolerant	0	26.67	No	51.4	Ibuprofen
197	63	M	85	0	No	Naive	2	15	No	103.73	Acetaminophen
198	64	F	82.09	0	No	Naive	0	8.33	Yes	52.75	Aspirin
199	72	F	71.82	0	No	Naive	4	25	Yes	79.18	Ibuprofen
200	79	F	61.36	0	No	Naive	6	5	Yes	78.85	Acetaminophen

The CONTENTS Procedure

Data Set Name	WORK.MY_NEW_DATA	Observations	200
Member Type	DATA	Variables	11
Engine	V9	Indexes	0
Created	23/11/2022 14:44:38	Observation Length	96
Last Modified	23/11/2022 14:44:38	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	NO
Label			
Data Representation	SOLARIS_X86_64, LINUX_X86_64, ALPHA_TRU64, LINUX_IA64		
Encoding	utf-8 Unicode (UTF-8)		

Engine/Host Dependent Information	
Data Set Page Size	131072
Number of Data Set Pages	1
First Data Page	1
Max Obs per Page	1363
Obs In First Data Page	200
Number of Data Set Repairs	0
Filename	/saswork/SAS_work2EBA00012812_odaws01-apse1.oda.sas.com/SAS_workB3A100012812_odaws01-apse1.oda.sas.com/my_new_data.sas7bdat
Release Created	9.0401M6
Host Created	Linux
Inode Number	1450269
Access Permission	rw-r--r--
Owner Name	u62322971
File Size	256KB
File Size (bytes)	262144

Alphabetic List of Variables and Attributes						
#	Variable	Type	Len	Format	Informat	Label
1	Age	Num	8	BEST8.		Age
7	Avg_Pain	Num	8	BEST11.		Average_Pain_Score
5	Epidural	Char	8	\$8.	\$8.	Epidural
2	Gender	Char	7	\$7.	\$7.	Gender
11	Hourly_Dose	Num	8			
4	IV_APAP	Num	8	BEST8.		IV_APAP
6	Opi_N_T	Char	12	\$12.	\$12.	Opiate Naive/Tolerant
10	TOT_LOS_H	Num	8	BEST8.		Length of Hospital Stay
8	Tot_Opiate_Use	Num	8	BEST8.		Total Opiate Use
9	Tramadol	Char	8	\$8.	\$8.	Tramadol
3	Weight	Num	8	BEST8.		Weight

The UNIVARIATE Procedure
Variable: Tot_Opiate_Use (Total Opiate Use)

Moments			
N	200	Sum Weights	200
Mean	36.16725	Sum Observations	7233.45
Std Deviation	32.0238104	Variance	1025.52444
Skewness	2.39337014	Kurtosis	9.86204225
Uncorrected SS	465693.357	Corrected SS	204079.363

Moments			
Coeff Variation	88.5436699	Std Error Mean	2.26442535

Basic Statistical Measures			
Location		Variability	
Mean	36.16725	Std Deviation	32.02381
Median	30.00000	Variance	1026
Mode	0.00000	Range	227.50000
		Interquartile Range	35.41500

Tests for Location: Mu0=0				
Test		Statistic	p Value	
Student's t	t	15.97193	Pr > t 	<.0001
Sign	M	96	Pr >= M 	<.0001
Signed Rank	S	9264	Pr >= S 	<.0001

Quantiles (Definition 5)	
Level	Quantile
100% Max	227.500
99%	181.415
95%	88.585
90%	74.000
75% Q3	50.000
50% Median	30.000
25% Q1	14.585
10%	5.660
5%	2.500
1%	0.000
0% Min	0.000

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0	110	110.50	7
0	93	122.67	9
0	82	156.99	103
0	77	205.84	174
0	72	227.50	83

The UNIVARIATE Procedure
Variable: TOT_LOS_H (Length of Hospital Stay)

Moments			
N	200	Sum Weights	200
Mean	70.18645	Sum Observations	14037.29
Std Deviation	30.9811806	Variance	959.833551
Skewness	6.43573144	Kurtosis	61.2941381
Uncorrected SS	1176234.43	Corrected SS	191006.877
Coeff Variation	44.141256	Std Error Mean	2.19070029

Basic Statistical Measures			
Location		Variability	
Mean	70.18645	Std Deviation	30.98118
Median	57.18500	Variance	959.83355

Basic Statistical Measures				
Location		Variability		
Mode	55.20000	Range		346.41000
		Interquartile Range		24.46000

Note: The mode displayed is the smallest of 2 modes with a count of 3.

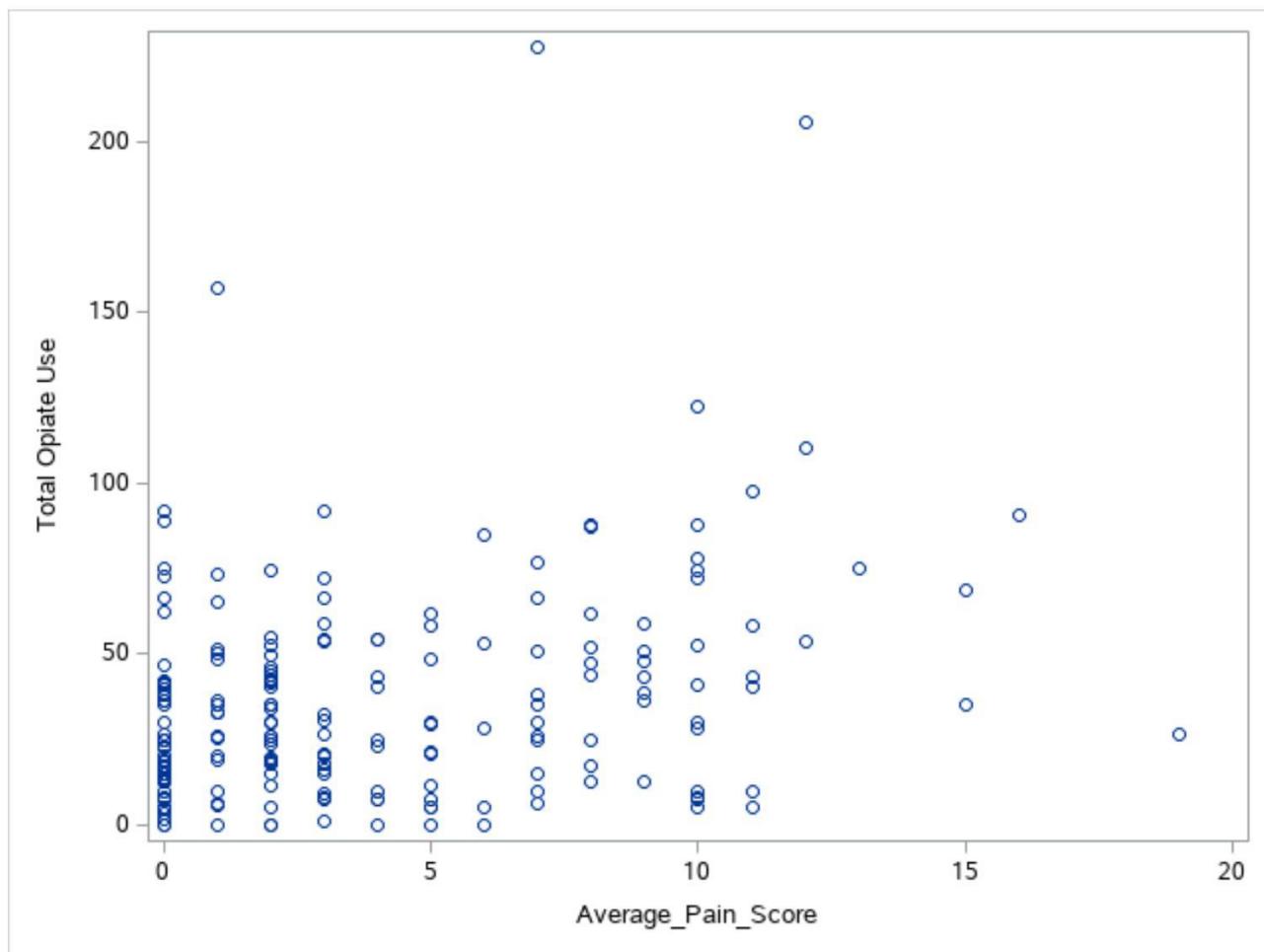
Tests for Location: Mu0=0				
Test	Statistic	p Value		
Student's t	t	32.03836	Pr > t	<.0001
Sign	M	100	Pr >= M	<.0001
Signed Rank	S	10050	Pr >= S	<.0001

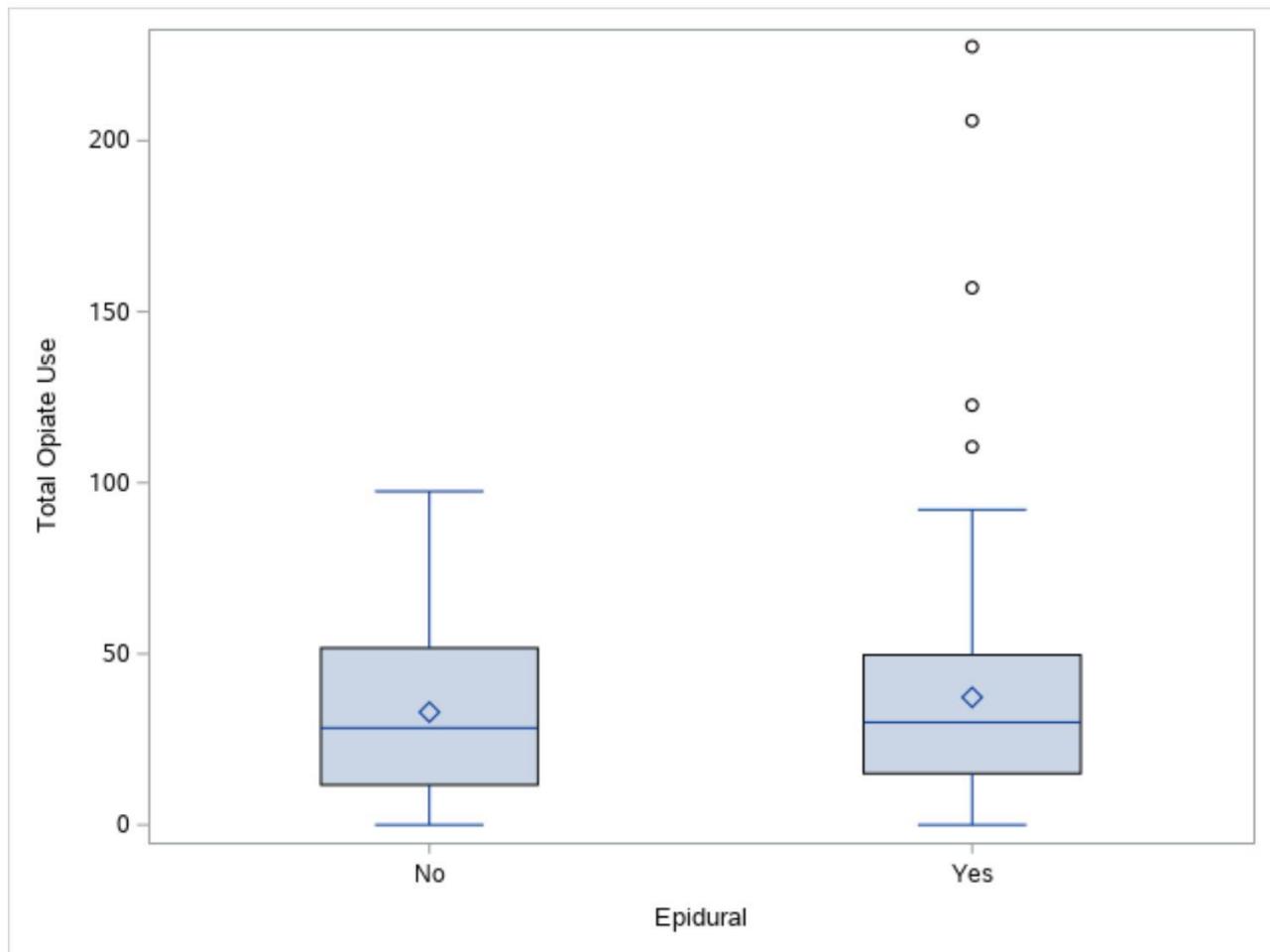
Quantiles (Definition 5)	
Level	Quantile
100% Max	395.030
99%	163.765
95%	115.515
90%	82.010
75% Q3	78.960
50% Median	57.185
25% Q1	54.500
10%	52.875
5%	51.650
1%	50.530
0% Min	48.620

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
48.62	166	149.85	141
50.48	164	149.97	29
50.58	134	153.23	97
50.63	172	174.30	3
50.67	48	395.03	22

The MEANS Procedure

IV_APAP	N Obs	Variable	Label	N	Mean	Std Dev	Minimum	Maximum
0	100	Tot_Opiate_Use TOT_LOS_H	Total Opiate Use Length of Hospital Stay	100 100	30.3853000 66.4508000	28.4504583 18.2072085	0 50.5800000	227.5000000 153.2300000
1	100	Tot_Opiate_Use TOT_LOS_H	Total Opiate Use Length of Hospital Stay	100 100	41.9492000 73.9221000	34.4157211 39.6190342	0 48.6200000	205.8400000 395.0300000





The CORR Procedure

2 Variables:	Tot_Opiate_Use Avg_Pain
---------------------	-------------------------

Simple Statistics							
Variable	N	Mean	Std Dev	Sum	Minimum	Maximum	Label
Tot_Opiate_Use	200	36.16725	32.02381	7233	0	227.50000	Total Opiate Use
Avg_Pain	200	3.97500	4.01935	795.00000	0	19.00000	Average_Pain_Score

Pearson Correlation Coefficients, N = 200		
Prob > r under H0: Rho=0		
	Tot_Opiate_Use	Avg_Pain
Tot_Opiate_Use	1.00000	0.29558 <.0001
Total Opiate Use		
Avg_Pain	0.29558 <.0001	1.00000
Average_Pain_Score		

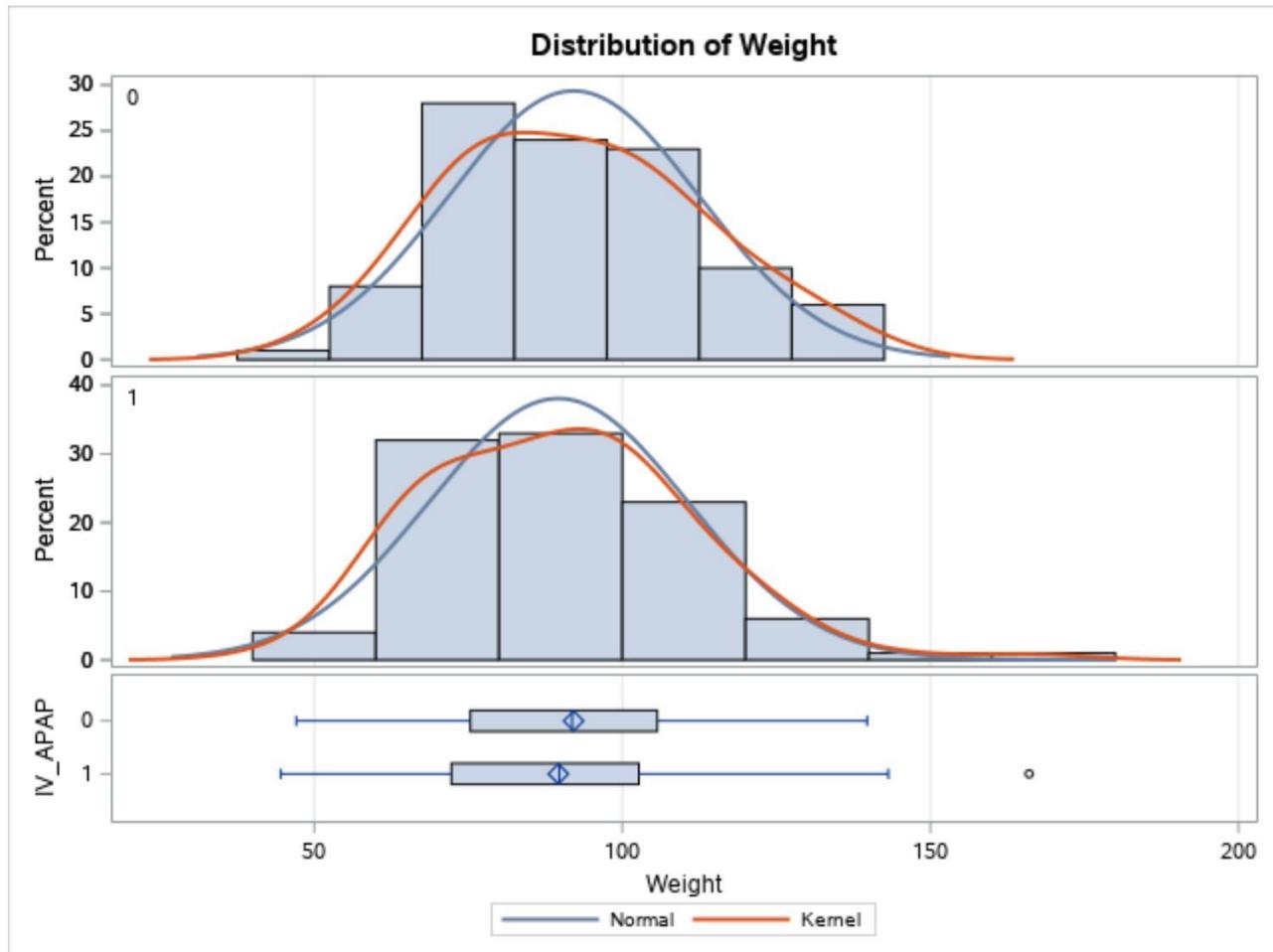
The TTEST Procedure**Variable: Weight (Weight)**

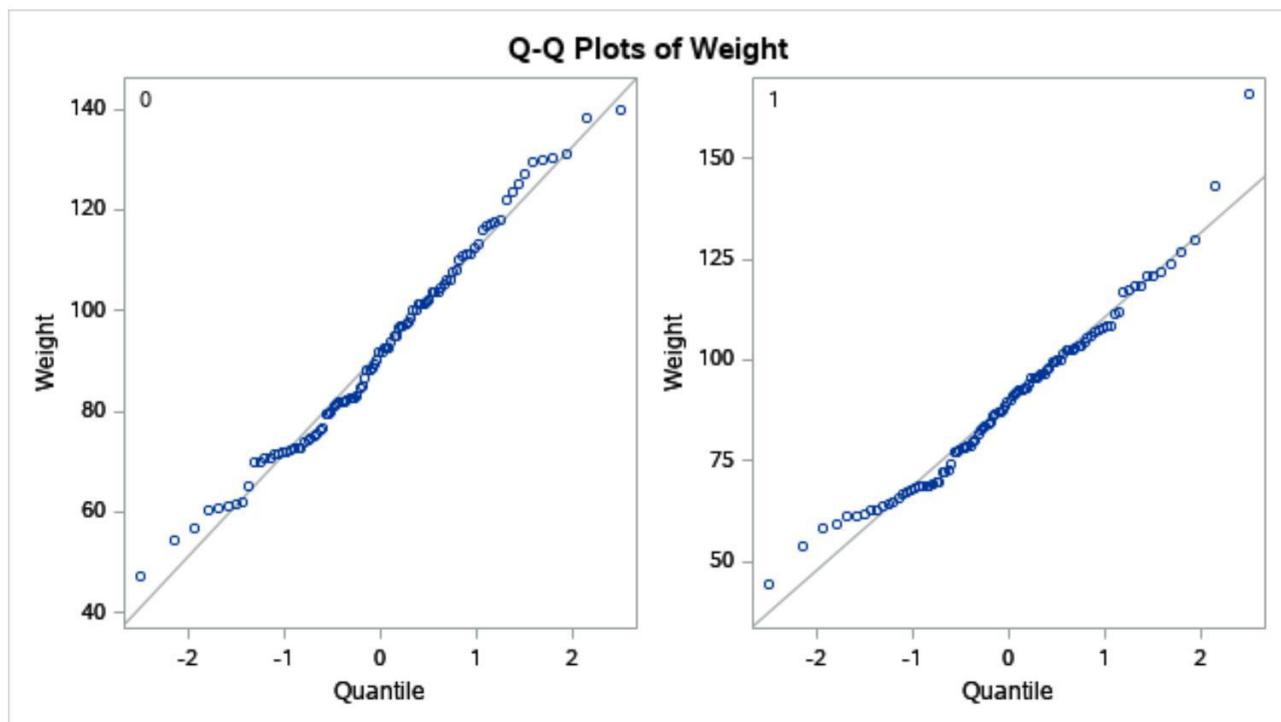
IV_APAP	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
0		100	92.1081	20.3839	2.0384	47.0900	139.7
1		100	89.6265	20.9536	2.0954	44.5500	166.0
Diff (1-2)	Pooled		2.4816	20.6707	2.9233		
Diff (1-2)	Satterthwaite		2.4816		2.9233		

IV_APAP	Method	Mean	95% CL Mean	Std Dev	95% CL Std Dev
0		92.1081	88.0635	96.1527	20.3839
1		89.6265	85.4688	93.7842	20.9536
Diff (1-2)	Pooled	2.4816	-3.2832	8.2464	20.6707
Diff (1-2)	Satterthwaite	2.4816	-3.2832	8.2464	

Method	Variances	DF	t Value	Pr > t
Pooled	Equal	198	0.85	0.3970
Satterthwaite	Unequal	197.85	0.85	0.3970

Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	99	99	1.06	0.7844





The TTEST Procedure

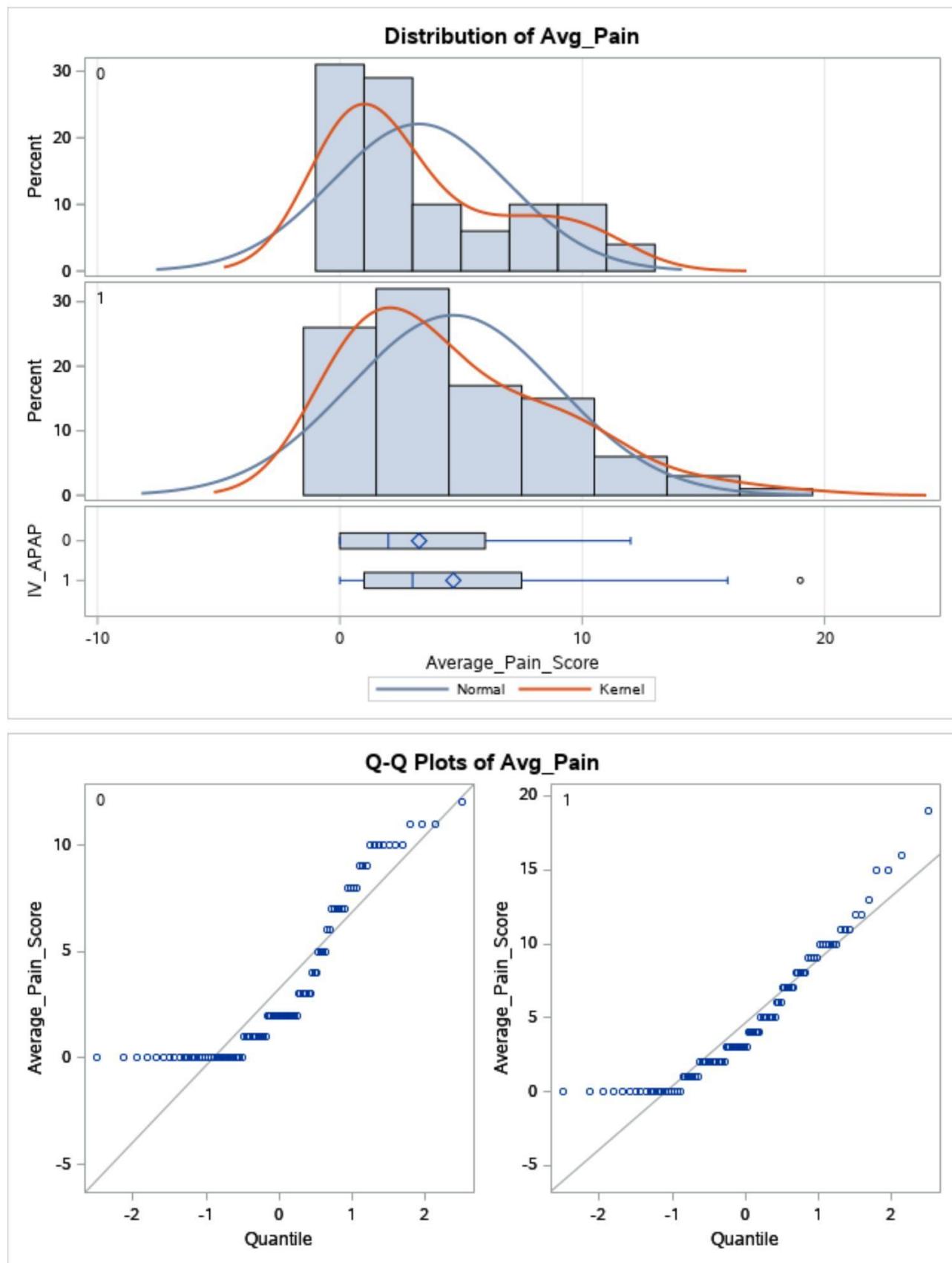
Variable: Avg_Pain (Average_Pain_Score)

IV_APAP	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
0		100	3.2700	3.6149	0.3615	0	12.0000
1		100	4.6800	4.2897	0.4290	0	19.0000
Diff (1-2)	Pooled		-1.4100	3.9667	0.5610		
Diff (1-2)	Satterthwaite		-1.4100		0.5610		

IV_APAP	Method	Mean	95% CL Mean	Std Dev	95% CL Std Dev
0		3.2700	2.5527	3.9873	3.6149
1		4.6800	3.8288	5.5312	4.2897
Diff (1-2)	Pooled	-1.4100	-2.5163	-0.3037	3.9667
Diff (1-2)	Satterthwaite	-1.4100	-2.5164	-0.3036	3.6115

Method	Variances	DF	t Value	Pr > t
Pooled	Equal	198	-2.51	0.0128
Satterthwaite	Unequal	192.47	-2.51	0.0128

Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	99	99	1.41	0.0902



The TTEST Procedure

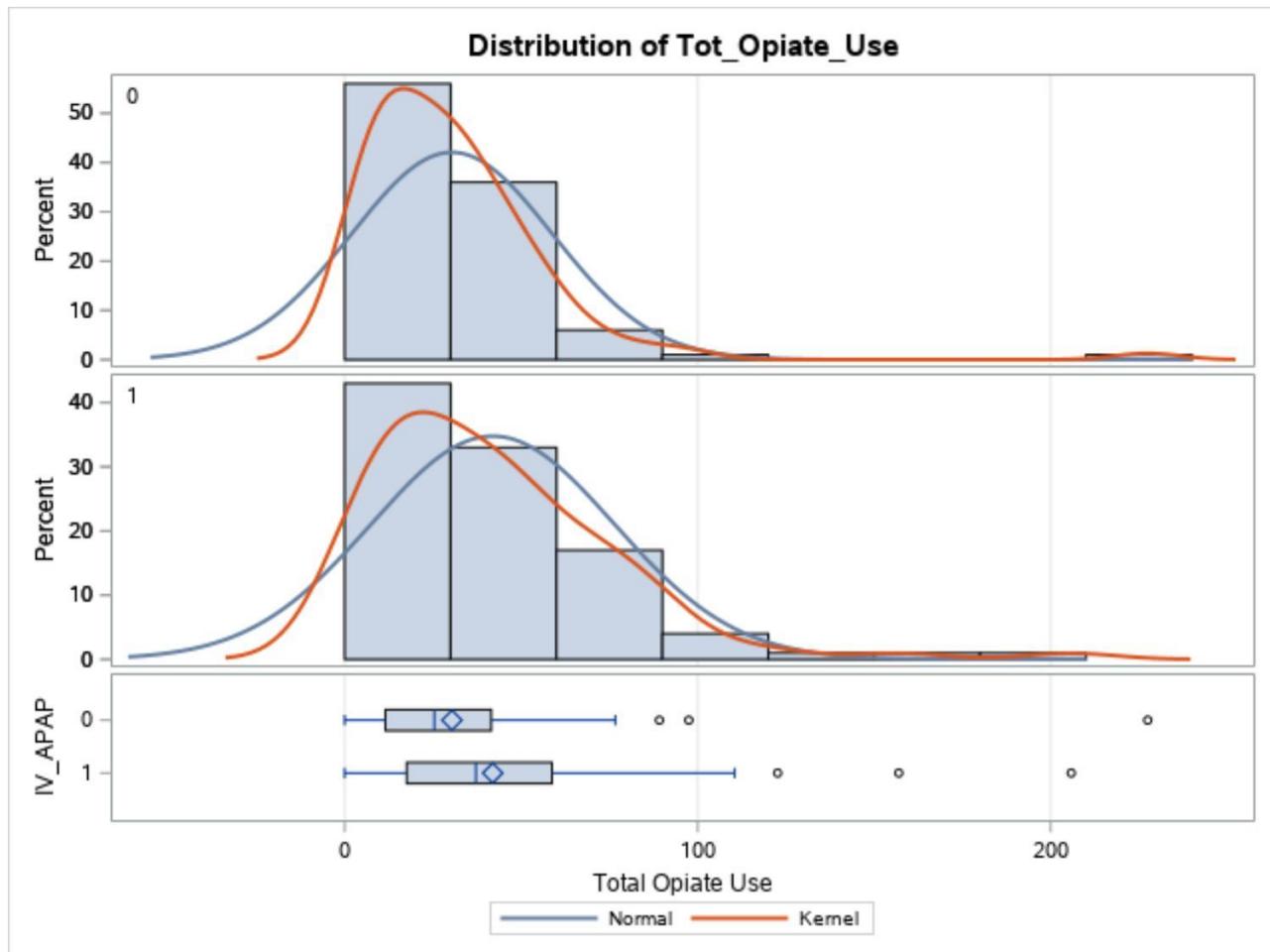
Variable: Tot_Opiate_Use (Total Opiate Use)

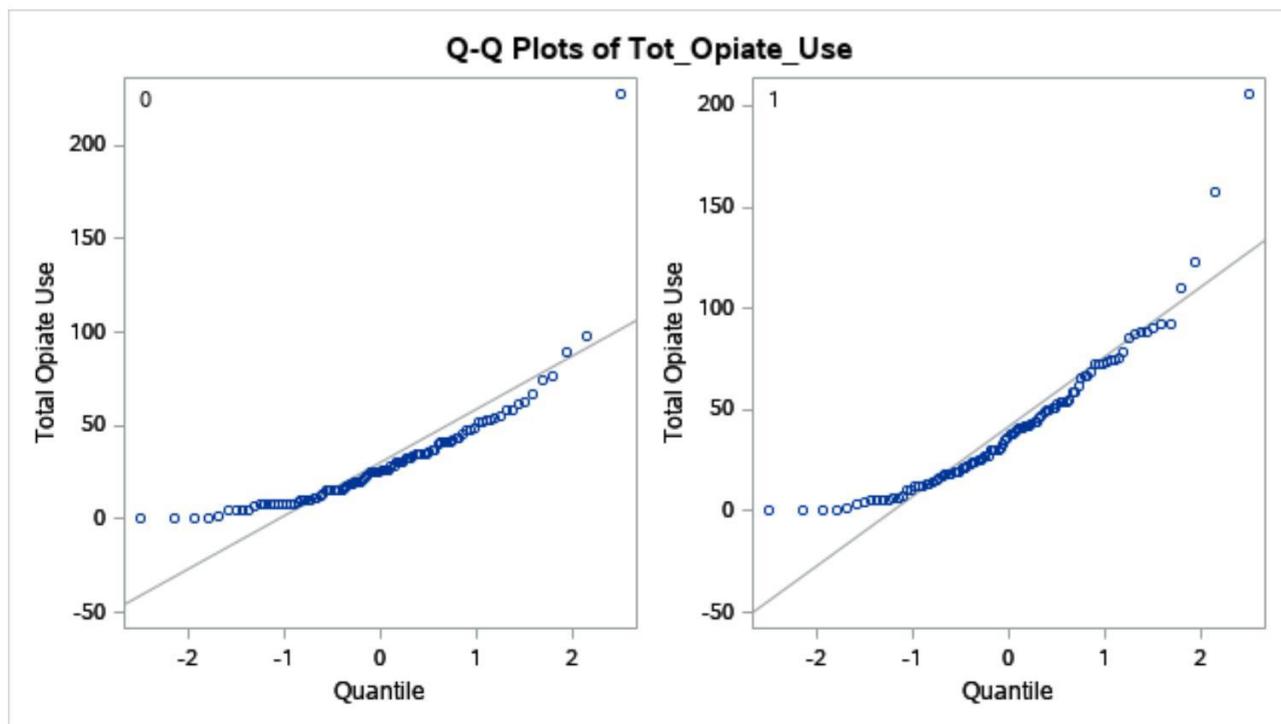
IV_APAP	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
0		100	30.3853	28.4505	2.8450	0	227.5
1		100	41.9492	34.4157	3.4416	0	205.8
Diff (1-2)	Pooled		-11.5639	31.5743	4.4653		
Diff (1-2)	Satterthwaite		-11.5639		4.4653		

IV_APAP	Method	Mean	95% CL Mean		Std Dev	95% CL Std Dev	
0		30.3853	24.7401	36.0305	28.4505	24.9797	33.0502
1		41.9492	35.1204	48.7780	34.4157	30.2172	39.9799
Diff (1-2)	Pooled	-11.5639	-20.3695	-2.7583	31.5743	28.7470	35.0231
Diff (1-2)	Satterthwaite	-11.5639	-20.3714	-2.7564			

Method	Variances	DF	t Value	Pr > t
Pooled	Equal	198	-2.59	0.0103
Satterthwaite	Unequal	191.24	-2.59	0.0103

Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	99	99	1.46	0.0596





The TTEST Procedure

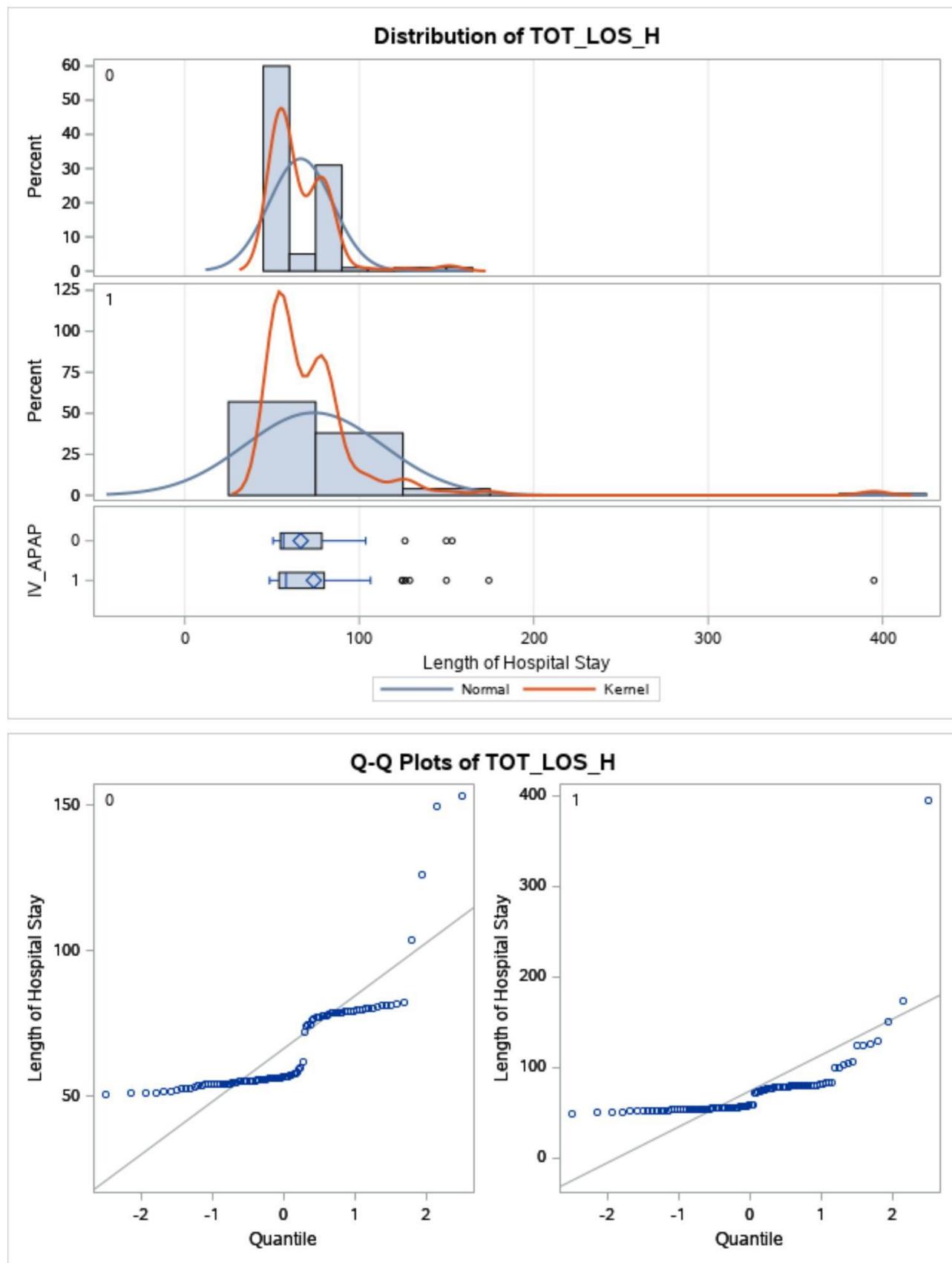
Variable: TOT_LOS_H (Length of Hospital Stay)

IV_APAP	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
0		100	66.4508	18.2072	1.8207	50.5800	153.2
1		100	73.9221	39.6190	3.9619	48.6200	395.0
Diff (1-2)	Pooled		-7.4713	30.8316	4.3602		
Diff (1-2)	Satterthwaite		-7.4713		4.3602		

IV_APAP	Method	Mean	95% CL Mean	Std Dev	95% CL Std Dev
0		66.4508	62.8381	70.0635	18.2072
1		73.9221	66.0608	81.7834	39.6190
Diff (1-2)	Pooled	-7.4713	-16.0698	1.1272	30.8316
Diff (1-2)	Satterthwaite	-7.4713	-16.0923	1.1497	28.0708

Method	Variances	DF	t Value	Pr > t
Pooled	Equal	198	-1.71	0.0882
Satterthwaite	Unequal	139.03	-1.71	0.0888

Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	99	99	4.74	<.0001



The FREQ Procedure

	Table of IV_APAP by Epidural		
	Epidural(Epidural)		
IV_APAP(IV_APAP)	No	Yes	Total
0	48 24.00 48.00 94.12	52 26.00 52.00 34.90	100 50.00
	3 1.50 3.00 5.88	97 48.50 97.00 65.10	100 50.00
	Total 51 25.50	149 74.50	200 100.00

Statistics for Table of IV_APAP by Epidural

Statistic	DF	Value	Prob
Chi-Square	1	53.2965	<.0001
Likelihood Ratio Chi-Square	1	61.6869	<.0001
Continuity Adj. Chi-Square	1	50.9541	<.0001
Mantel-Haenszel Chi-Square	1	53.0300	<.0001
Phi Coefficient		0.5162	
Contingency Coefficient		0.4587	
Cramer's V		0.5162	

Fisher's Exact Test	
Cell (1,1) Frequency (F)	48
Left-sided Pr <= F	1.0000
Right-sided Pr >= F	<.0001
Table Probability (P)	<.0001
Two-sided Pr <= P	<.0001

Statistic	Value	ASE
Gamma	0.9352	0.0389
Kendall's Tau-b	0.5162	0.0490
Stuart's Tau-c	0.4500	0.0528
Somers' D C R	0.4500	0.0528
Somers' D R C	0.5922	0.0511
Pearson Correlation	0.5162	0.0490
Spearman Correlation	0.5162	0.0490
Lambda Asymmetric C R	0.0000	0.0000
Lambda Asymmetric R C	0.4500	0.0905
Lambda Symmetric	0.2980	0.0679
Uncertainty Coefficient C R	0.2716	0.0525
Uncertainty Coefficient R C	0.2225	0.0466
Uncertainty Coefficient Symmetric	0.2446	0.0490

Odds Ratio and Relative Risks			
Statistic	Value	95% Confidence Limits	
Odds Ratio	29.8462	8.8638	100.4980
Relative Risk (Column 1)	16.0000	5.1531	49.6793
Relative Risk (Column 2)	0.5361	0.4427	0.6492

Sample Size = 200

The FREQ Procedure

Frequency Percent Row Pct Col Pct	Table of IV_APAP by Opi_N_T				
	IV_APAP(IV_APAP)	Opi_N_T(Opiate Naive/Tolerant)			
0		Naive	Tolerant	Yes	Total
0	79 39.50 79.00 50.97	21 10.50 21.00 47.73	0 0.00 0.00 0.00	100 50.00	
1	76 38.00 76.00 49.03	23 11.50 23.00 52.27	1 0.50 1.00 100.00	100 50.00	
Total	155 77.50	44 22.00	1 0.50	200 100.00	

Statistics for Table of IV_APAP by Opi_N_T

Statistic	DF	Value	Prob
Chi-Square	2	1.1490	0.5630
Likelihood Ratio Chi-Square	2	1.5353	0.4641
Mantel-Haenszel Chi-Square	1	0.4254	0.5142
Phi Coefficient		0.0758	
Contingency Coefficient		0.0756	
Cramer's V		0.0758	
WARNING: 33% of the cells have expected counts less than 5. Chi-Square may not be a valid test.			

Statistic	Value	ASE
Gamma	0.0914	0.1673
Kendall's Tau-b	0.0383	0.0704
Stuart's Tau-c	0.0321	0.0590
Somers' D C R	0.0321	0.0590
Somers' D R C	0.0457	0.0839
Pearson Correlation	0.0462	0.0701
Spearman Correlation	0.0384	0.0706
Lambda Asymmetric C R	0.0000	0.0000
Lambda Asymmetric R C	0.0300	0.0661
Lambda Symmetric	0.0207	0.0457
Uncertainty Coefficient C R	0.0069	0.0069
Uncertainty Coefficient R C	0.0055	0.0057
Uncertainty Coefficient Symmetric	0.0061	0.0062

Sample Size = 200**The FREQ Procedure**

Frequency Percent Row Pct Col Pct	Table of IV_APAP by Tramadol			
	IV_APAP(IV_APAP)	Tramadol(Tramadol)		
0		No	Yes	Total
0	73 36.50 73.00 46.20	27 13.50 27.00 64.29	100 50.00	
1	85 42.50 85.00 53.80	15 7.50 15.00 35.71	100 50.00	

Table of IV_APAP by Tramadol			
IV_APAP(IV_APAP)	Tramadol(Tramadol)		
	No	Yes	Total
Total	158 79.00	42 21.00	200 100.00

Statistics for Table of IV_APAP by Tramadol

Statistic	DF	Value	Prob
Chi-Square	1	4.3400	0.0372
Likelihood Ratio Chi-Square	1	4.3891	0.0362
Continuity Adj. Chi-Square	1	3.6468	0.0562
Mantel-Haenszel Chi-Square	1	4.3183	0.0377
Phi Coefficient		-0.1473	
Contingency Coefficient		0.1457	
Cramer's V		-0.1473	

Fisher's Exact Test	
Cell (1,1) Frequency (F)	73
Left-sided Pr <= F	0.0277
Right-sided Pr >= F	0.9884
Table Probability (P)	0.0160
Two-sided Pr <= P	0.0554

Statistic	Value	ASE
Gamma	-0.3540	0.1572
Kendall's Tau-b	-0.1473	0.0687
Stuart's Tau-c	-0.1200	0.0570
Somers' D C R	-0.1200	0.0570
Somers' D R C	-0.1808	0.0839
Pearson Correlation	-0.1473	0.0687
Spearman Correlation	-0.1473	0.0687
Lambda Asymmetric C R	0.0000	0.0000
Lambda Asymmetric R C	0.1200	0.1179
Lambda Symmetric	0.0845	0.0848
Uncertainty Coefficient C R	0.0213	0.0200
Uncertainty Coefficient R C	0.0158	0.0149
Uncertainty Coefficient Symmetric	0.0182	0.0171

Odds Ratio and Relative Risks			
Statistic	Value	95% Confidence Limits	
Odds Ratio	0.4771	0.2359	0.9651
Relative Risk (Column 1)	0.8588	0.7430	0.9927
Relative Risk (Column 2)	1.8000	1.0210	3.1735

Sample Size = 200

The REG Procedure
Model: MODEL1
Dependent Variable: Tot_Opiate_Use Total Opiate Use

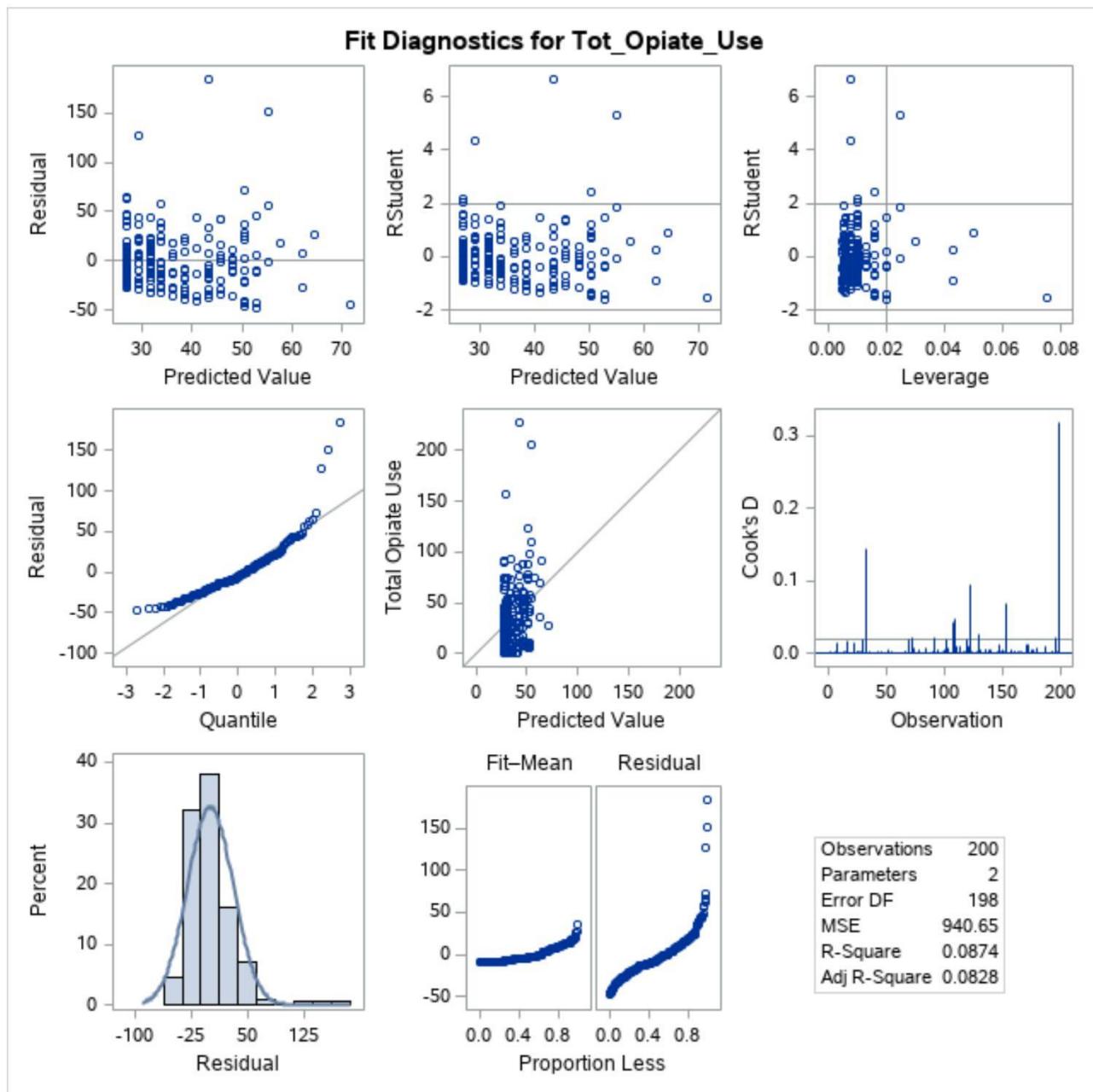
Number of Observations Read	200
Number of Observations Used	200

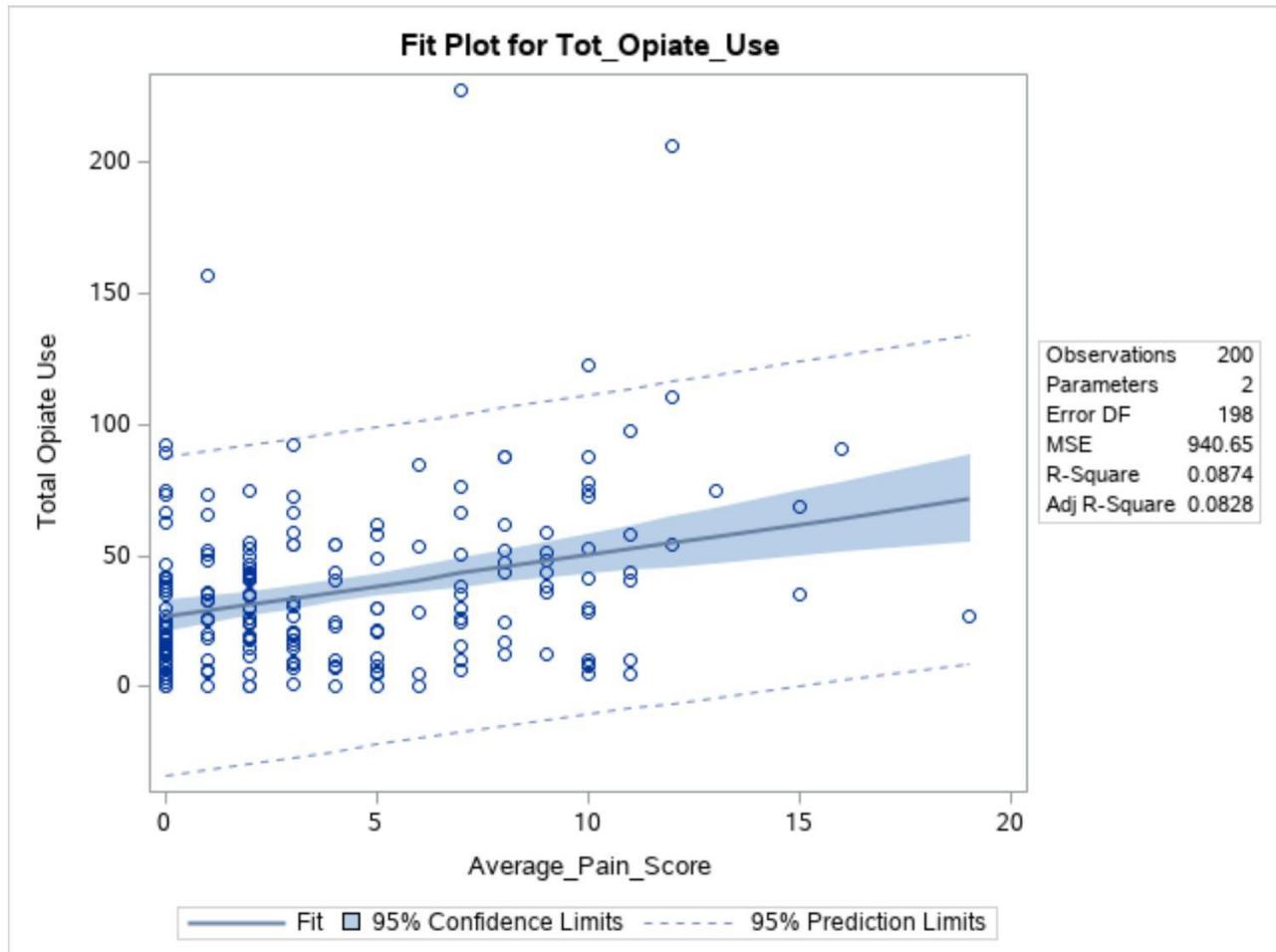
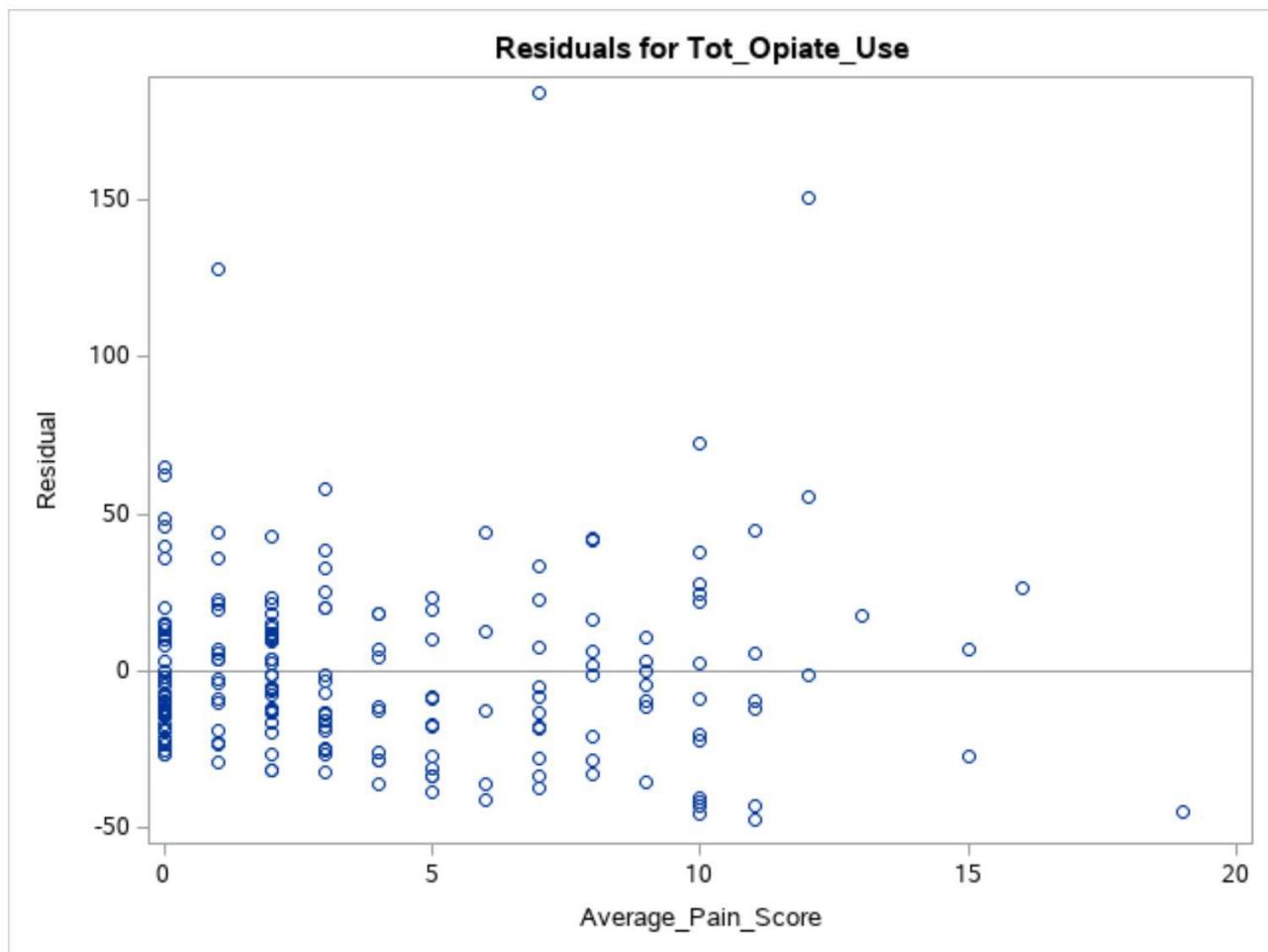
Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	17830	17830	18.96	<.0001
Error	198	186249	940.65148		
Corrected Total	199	204079			

Root MSE	30.67004	R-Square	0.0874
Dependent Mean	36.16725	Adj R-Sq	0.0828
Coeff Var	84.80059		

Parameter Estimates						
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	Intercept	1	26.80597	3.05392	8.78	<.0001
Avg_Pain	Average_Pain_Score	1	2.35504	0.54092	4.35	<.0001

The REG Procedure
Model: MODEL1
Dependent Variable: Tot_Opiate_Use Total Opiate Use





The REG Procedure
Model: MODEL1
Dependent Variable: Tot_Opiate_Use Total Opiate Use

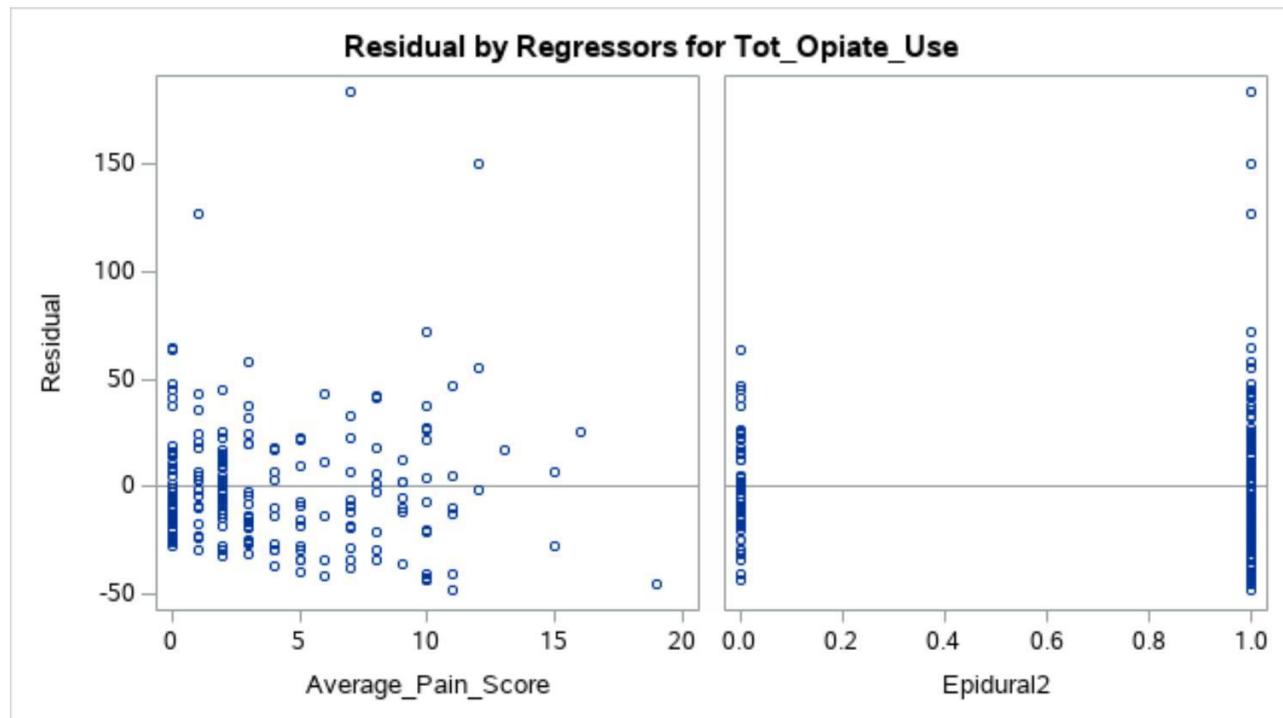
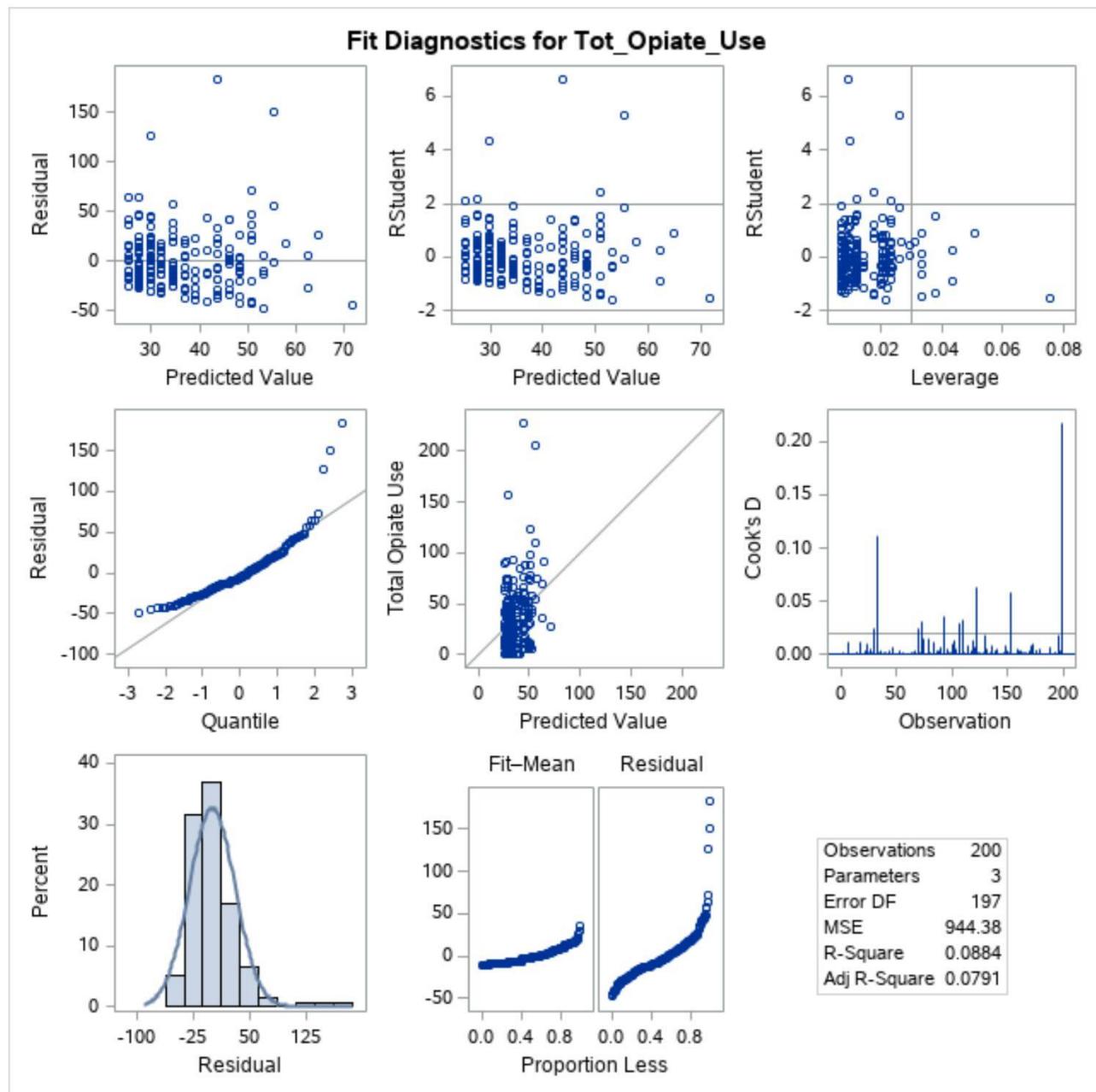
Number of Observations Read	200
Number of Observations Used	200

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	18037	9018.46801	9.55	0.0001
Error	197	186042	944.37780		
Corrected Total	199	204079			

Root MSE	30.73073	R-Square	0.0884
Dependent Mean	36.16725	Adj R-Sq	0.0791
Coeff Var	84.96839		

Parameter Estimates						
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	Intercept	1	25.15351	4.67409	5.38	<.0001
Avg_Pain	Average_Pain_Score	1	2.33193	0.54424	4.28	<.0001
Epidural2		1	2.34134	5.00618	0.47	0.6405

The REG Procedure
Model: MODEL1
Dependent Variable: Tot_Opiate_Use Total Opiate Use





Bharatiya Vidya Bhavan's
Sardar Patel Institute of Technology
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

Conclusion

1. We carried out EDA on the data. The data was taken from a medical repository.
2. We have Age, Gender, Weight, IV_APAP, Epidural Opi_N_T, Average_Pain_Score, Tot_Opi, Tramadol, TOT_LOS_H, Painkiller. The target column here is Painkiller and the target here is to predict which type of painkiller should we give to the patient.
3. We found out all the statistical parameters like Mean, Median, Standard Deviation, etc.
4. While plotting the box-plot we came to know that “Epidural” column has many outliers, so we removed the outliers.
5. We did T-Test, Chi-Square Test and Regression Analysis on our data.