0.1 The Kaplan-Meier estimation of the survival function

Estimation of the overall survival of Beta-Thalassemia major patients

Table 1: Overall survival of Beta-Thalassemia major patients

Number of patients	Number of deaths	Survival time (in years)
578	46	43

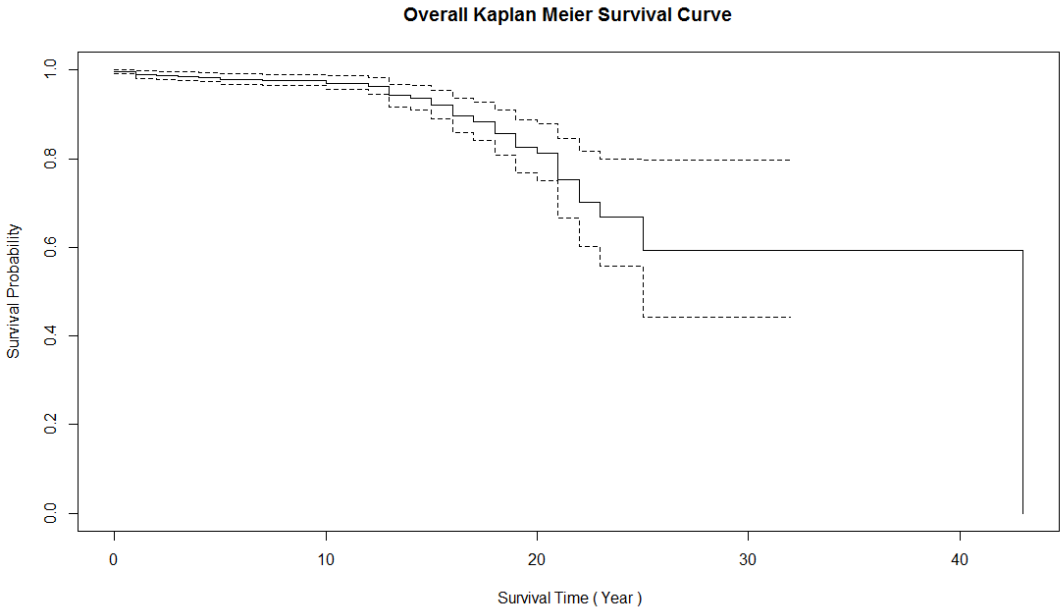

Figure 1: Overall Kaplan-Meier survival curve

Survival of Beta-Thalassemia major patients by gender

	n	events	median	0.95LCL	0.95UCL
GENDER=1	333	30	43	25	NA
GENDER=2	245	16	NA	23	NA

Figure 2: Survival by gender

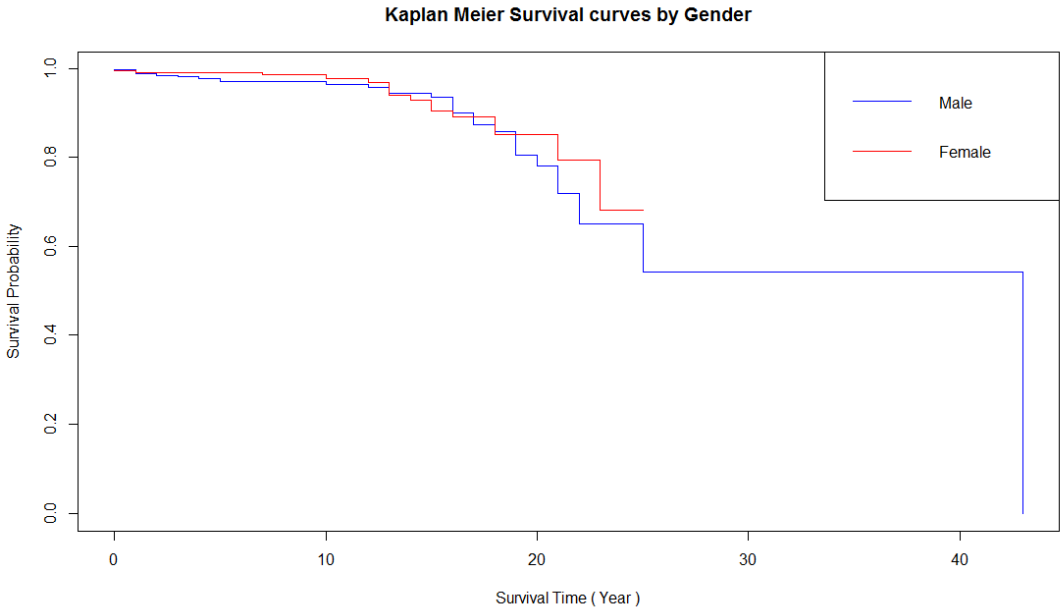

Figure 3: Kaplan-Meier survival curves by gender

Survival of Beta-Thalassemia major patients by blood group

	n	events	median	0.95LCL	0.95UCL
BLOOD_GP=1	127	8	NA	21	NA
BLOOD_GP=2	190	10	43	NA	NA
BLOOD_GP=3	226	25	25	22	NA
BLOOD_GP=4	35	3	NA	18	NA

Figure 4: Survival by blood group

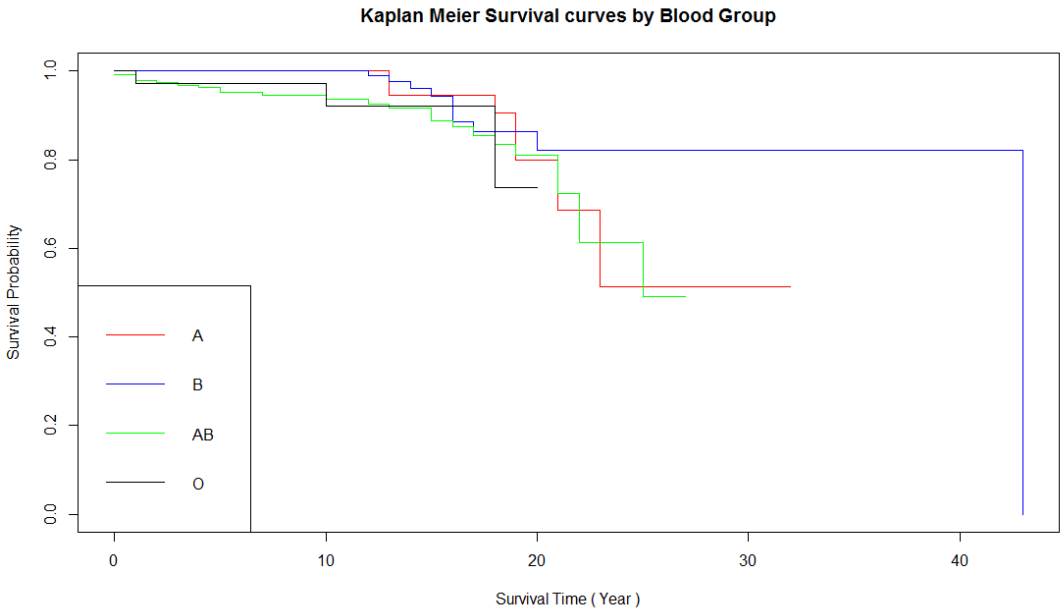

Figure 5: Kaplan-Meier survival curves by blood group

Survival of Beta-Thalassemia major patients by Rh factor

	n	events	median	0.95LCL	0.95UCL
RH_FACTOR=1	530	45	43	25	NA
RH_FACTOR=2	48	1	23	23	NA

Figure 6: Survival by Rh factor

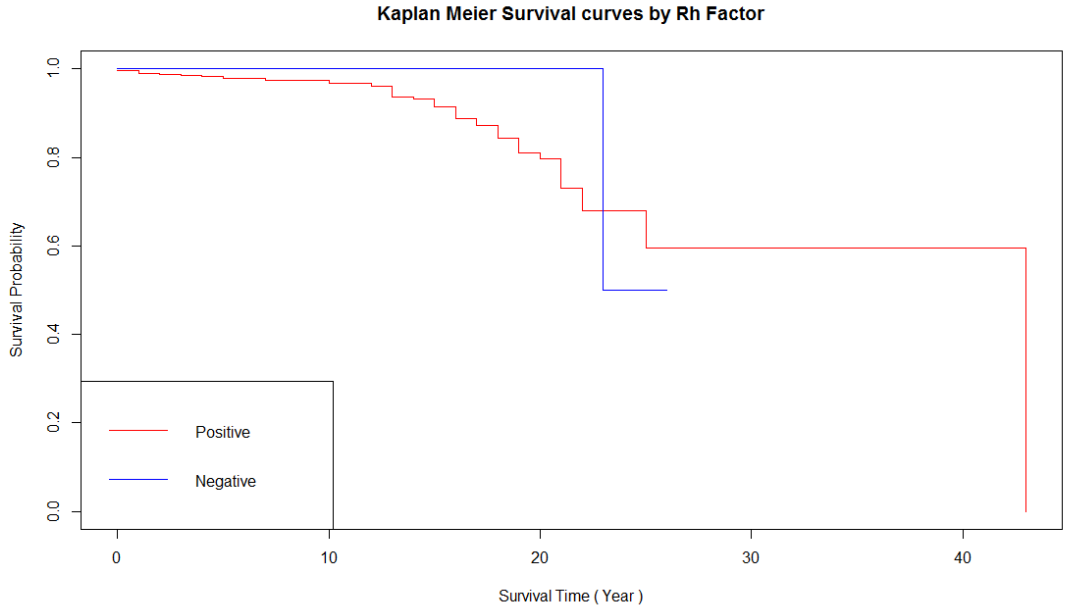

Figure 7: Kaplan-Meier survival curves by Rh factor

Survival of Beta-Thalassemia major patients by kind of transfused blood

	n	events	median	0.95LCL	0.95UCL
KTB=1	568	42	43	25	NA
KTB=2	10	4	19	16	NA

Figure 8: Survival by kind of blood transfused

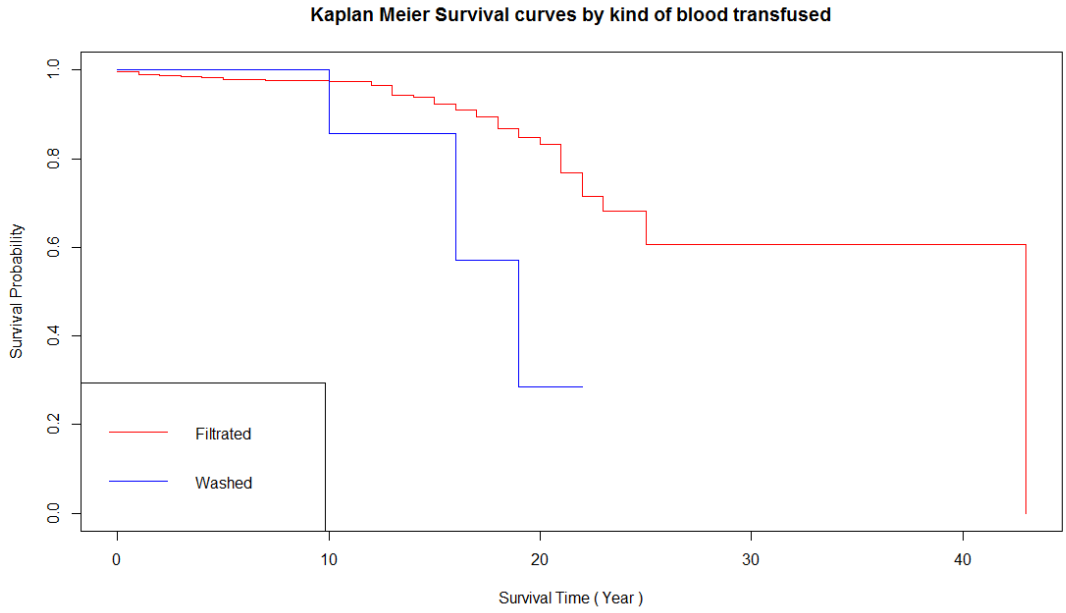

Figure 9: Kaplan-Meier survival curves by kind of transfused blood

Survival of Beta-Thalassemia major patients by annual number of transfusions

	n	events	median	0.95LCL	0.95UCL
ANOT=1	100	10	NA	20	NA
ANOT=2	478	36	43	25	NA

Figure 10: Survival by annual number of transfusions

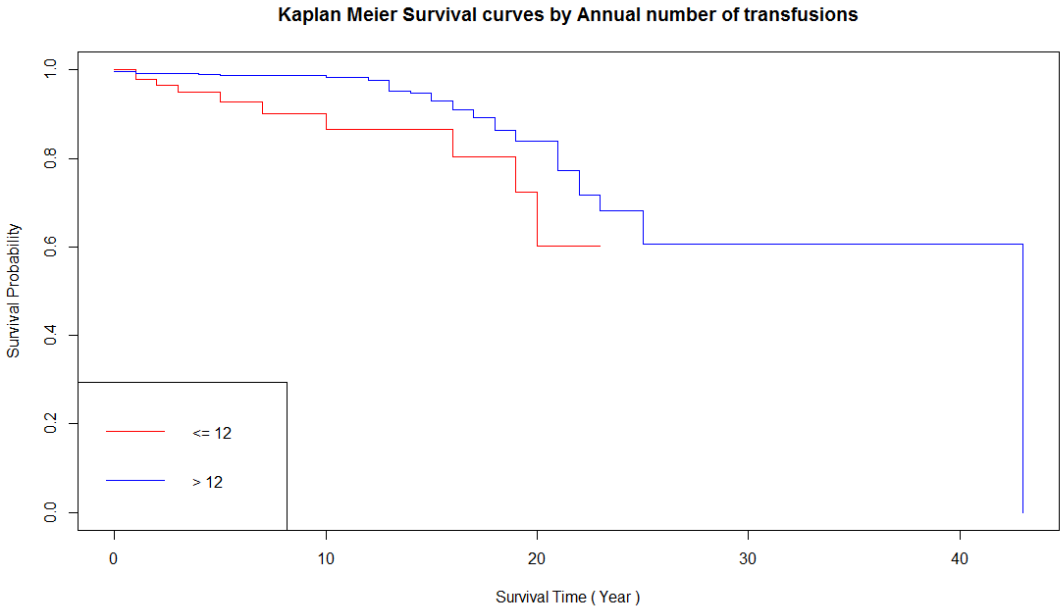

Figure 11: Kaplan-Meier survival curves by annual number of transfusions

Survival of Beta-Thalassemia major patients by hemoglobin level

	n	events	median	0.95LCL	0.95UCL
HB=1	147	15	NA	21	NA
HB=2	431	31	43	25	NA

Figure 12: Survival by hemoglobin level

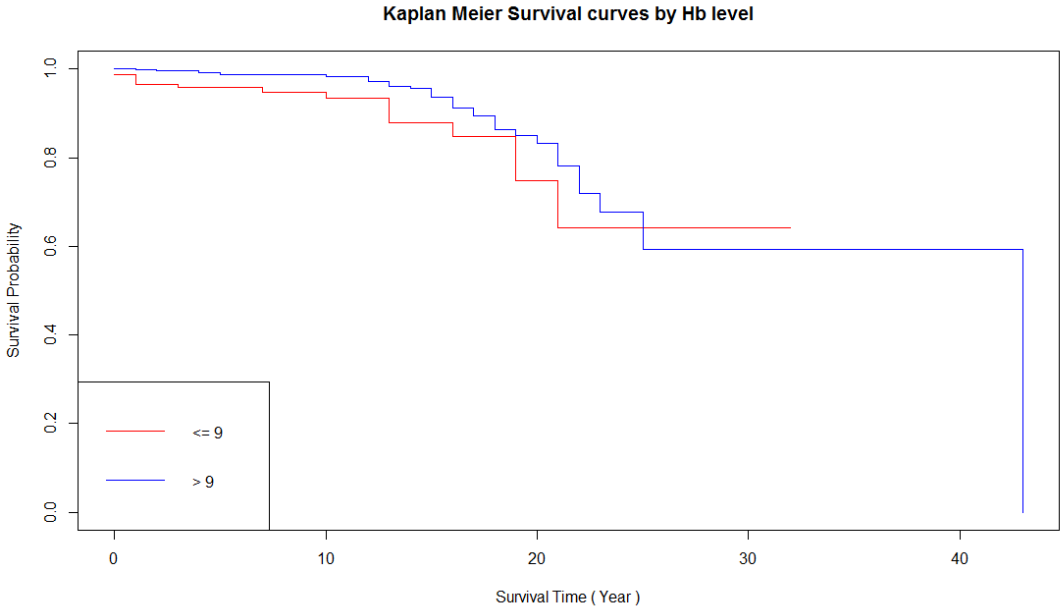

Figure 13: Kaplan-Meier survival curves by hemoglobin level

Survival of Beta-Thalassemia major patients by accompanied diseases

	n	events	median	0.95LCL	0.95UCL
AD=0	355	2	NA	NA	NA
AD=1	126	27	22	21	NA
AD=2	5	4	15	15	NA
AD=3	45	4	25	25	NA
AD=5	19	5	NA	21	NA
AD=9	28	4	NA	16	NA

Figure 14: Survival by accompanied diseases

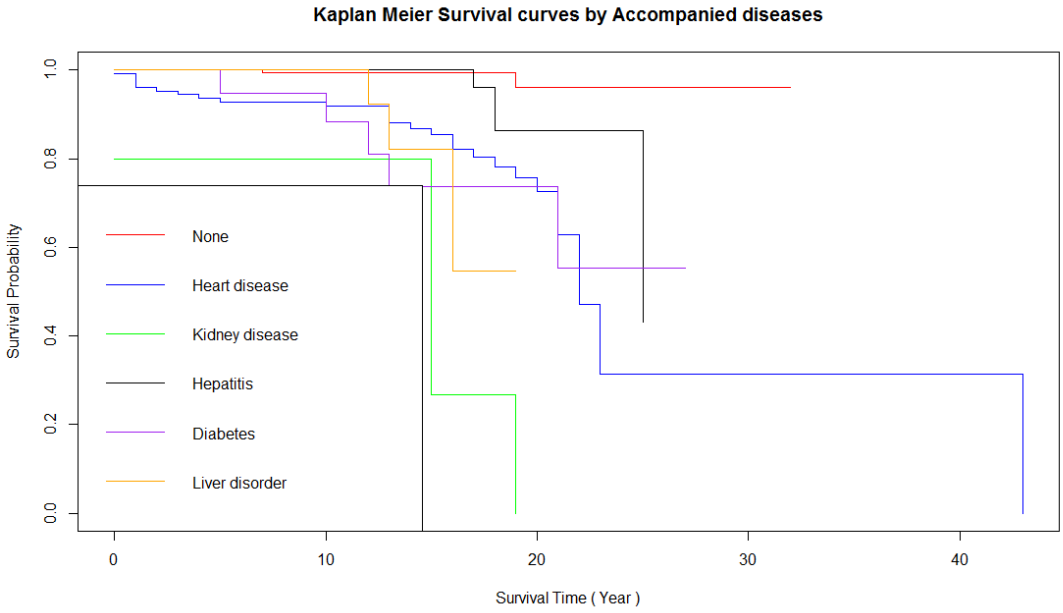

Figure 15: Kaplan-Meier survival curves by accompanied diseases

0.1.1 The non-parametric comparisons of the survival distributions and hypothesis testing

The comparison of survival curves by gender

```
             N Observed Expected (O-E)^2/E (O-E)^2/V
GENDER=1 333       30     27.2     0.282     0.716
GENDER=2 245       16     18.8     0.409     0.716

 Chisq= 0.7  on 1 degrees of freedom, p= 0.4
```

Figure 16: The log-rank test values for gender

The results of the log-rank test for gender were displayed in figure 16.

H_0 : There is no difference in the survival experience of patients by gender

H_1 : There is a difference in the survival experience of patients by gender

According to the results generated by the log-rank test, the calculated p-value is 0.4 and the significance level for the test was 0.05. Thus, the p-value is greater than the significance level and the null hypothesis is not rejected.

The comparison of survival curves by blood group

```
               N Observed Expected (O-E)^2/E (O-E)^2/V
BLOOD_GP=1 127        8     9.99     0.395     0.517
BLOOD_GP=2 190       10    16.18     2.361     3.860
BLOOD_GP=3 226       25    17.80     2.912     4.914
BLOOD_GP=4  35        3     2.03     0.461     0.492

 Chisq= 6.4  on 3 degrees of freedom, p= 0.09
```

Figure 17: The log-rank test values for blood group

The results of the log-rank test for blood group were displayed in figure 17.

H_0 : There is no difference in the survival experience of patients by blood group

H_1 : There is a difference in the survival experience of patients by blood group

According to the results generated by the log-rank test, the calculated p-value is

0.09 and the significance level for the test was 0.05. Thus, the p-value is greater than the significance level and the null hypothesis is not rejected.

The comparison of survival curves by Rh factor

	N	Observed	Expected	(O-E)^2/E	(O-E)^2/V
RH_FACTOR=1	530	45	42.22	0.183	2.26
RH_FACTOR=2	48	1	3.78	2.044	2.26

Chisq= 2.3 on 1 degrees of freedom, p= 0.1

Figure 18: The log-rank test values for Rh factor

The results of the log-rank test for Rh factor were displayed in figure 18.

H_0 : There is no difference in the survival experience of patients by Rh factor

H_1 : There is a difference in the survival experience of patients by Rh factor

According to the results generated by the log-rank test, the calculated p-value is 0.1 and the significance level for the test was 0.05. Thus, the p-value is greater than the significance level and the null hypothesis is not rejected.

The comparison of survival curves by kind of transfused blood

	N	Observed	Expected	(O-E)^2/E	(O-E)^2/V
KTB=1	568	42	44.94	0.192	8.53
KTB=2	10	4	1.06	8.168	8.53

Chisq= 8.5 on 1 degrees of freedom, p= 0.004

Figure 19: The log-rank test values for kind of transfused blood

The results of the log-rank test for kind of blood transfused were displayed in figure 19.

H_0 : There is no difference in the survival experience of patients by kind of blood transfused

H_1 : There is a difference in the survival experience of patients by kind of blood transfused

According to the results generated by the log-rank test, the calculated p-value is 0.004 and the significance level for the test was 0.05. Thus, the p-value is less than the significance level and the null hypothesis is rejected.

The comparison of survival curves by annual number of transfusions

```
          N Observed Expected (O-E)^2/E (O-E)^2/V
ANOT=1 100       10     4.45      6.90      7.86
ANOT=2 478       36    41.55      0.74      7.86

 Chisq= 7.9  on 1 degrees of freedom, p= 0.005
```

Figure 20: The log-rank test values for annual number of transfusions

The results of the log-rank test for annual number of transfusions were displayed in figure 20.

H_0 : There is no difference in the survival experience of patients by annual number of transfusions
H_1 : There is a difference in the survival experience of patients by annual number of transfusions

According to the results generated by the log-rank test, the calculated p-value is 0.005 and the significance level for the test was 0.05. Thus, the p-value is less than the significance level and the null hypothesis is rejected.

The comparison of survival curves by hemoglobin level

```
          N Observed Expected (O-E)^2/E (O-E)^2/V
HB=1 147       15     9.47      3.228      4.17
HB=2 431       31    36.53      0.837      4.17

 Chisq= 4.2  on 1 degrees of freedom, p= 0.04
```

Figure 21: The log-rank test values for hemoglobin level

The results of the log-rank test for hemoglobin level were displayed in figure 21

H_0 : There is no difference in the survival experience of patients by hemoglobin level
H_1 : There is a difference in the survival experience of patients by hemoglobin level

According to the results generated by the log-rank test, the calculated p-value is 0.04 and the significance level for the test was 0.05. Thus, the p-value is less than the significance level and the null hypothesis is rejected.

The comparison of survival curves by accompanied diseases

	N	Observed	Expected	(O-E)^2/E	(O-E)^2/V
AD=0	355	2	19.812	16.01	30.27
AD=1	126	27	14.714	10.26	16.44
AD=2	5	4	0.392	33.17	33.93
AD=3	45	4	7.037	1.31	1.62
AD=5	19	5	2.622	2.16	2.35
AD=9	28	4	1.423	4.67	4.93

Chisq= 70.1 on 5 degrees of freedom, p= 1e-13

Figure 22: The log-rank test values for accompanied diseases

The results of the log-rank test for accompanied diseases were displayed in figure 22

H_0 : There is no difference in the survival experience of patients by accompanied disease

H_1 : There is a difference in the survival experience of patients by accompanied disease

According to the results generated by the log-rank test, the calculated p-value is 10^{-13} and the significance level for the test was 0.05. Thus, the p-value is less than the significance level and the null hypothesis is rejected.