CHAPTER VIII

SUMMARY AND CONCLUSION

The findings of any research work should be such that they have the real life applications. In this thesis application of survival analysis in the study of chronic diseases has been discussed. Numerical analysis are carried out using real life data and secondary data available in the literature. The following is the summary of the findings and conclusion drawn on the basis of the different chapters of the thesis are summarized below.

On the basis of the numerical illustrations in Chapter III, from the multiple regression analysis for diabetic retinopathy patients, the duration of hypertension, diastolic blood pressure and HbA$_1$C are the three variables has influence over the Optimal Coherence Topographic (OCT) value which indicates the level of damage caused to retina. From the non diabetic retinopathy patients, the level of diastolic blood pressure has also influence, and the High Density Lipoprotein (HDL) has a negative impact on the OCT value because ‘t’ statistic is significant. If HDL increases then the level of OCT decreases. It is also observed from the Hotelling’s $T^2$ that the hypertension, diastolic blood pressure, OCT value, triglycerides and age are significantly different between the two groups. In binary logistic approach for the both group of patients, a person can avoid the incidence of retinopathy (or) it’s progression by control over the influence variables diastolic BP, LDL, sex, duration of hypertension and duration of smoking.

On the basis of the numerical illustrations in Chapter IV, from the Stochastic approach, the probability of an individual with the 1$^{st}$ stage of diabetic retinopathy is remain in the 1$^{st}$ stage it’s self after a period of 5 years, which is very small, similarly for a person at the 5$^{th}$ stage of retinopathy is to move to the lower stages is absolutely zero.
For the non-diabetic patients, the chance of moving from the other lower grades to the final grade is fairly high. The severity of the retinopathy increases with the passage of time,

From Chapter V, the robust standard error estimates are appreciably smaller than the naive estimates. The treatment appears to be effective, and this effect is much stronger for adult onset diabetes than for juvenile onset diabetes. The marginal approach is expected to be more efficient than the frailty model provided that the frailty distribution is correctly specified. However the types of dependence by the frailty model are quite limited and fitting is rather difficult, cumbersome.

From Chapter VI, in the linear case patient survival status and age at transplant are the variables mainly influences the survival time in days. It is also found that in quadratic patient survival status and age are the two variables, which influences the survival time in days. Among the four approaches Cox’s PH and AFT model for heart transplant data seems to be more consistent than the Miller and Koul et.al. approaches.

From Chapter VII, in the case of lung cancer data, the treatment and age were marginally normal, and the correlation between treatment and age have moderate the three regressors with non-zero coefficients. From the analysis of liver data, the standardized LASSO parameter and the resulting model from the lasso looks similar to the stepwise model and full model. The LASSO technique for the Cox model seems to be worthy competitor for stepwise selection. The LASSO clearly outperforms well and picks approximately the correct number of zero coefficients.

The various analysis discussed in different chapters of the thesis serve as a tool so that suitable medical and precautionary measures can be adopted to arrest the growth and progression of chronic diseases.