CHAPTER VI

SUMMARY AND CONCLUSION

In this work, we have comprehensively reviewed the concepts of survival analysis and their techniques with special attention of Cox PH in exploring the survival data. The different characterizations of survival time and related concepts are also presented. The work also deals with parametric, nonparametric, semi-parametric and accelerated failure time models. Empirical comparisons are made using HIV-TB clinical trial data.

The mean survival time for female had lower survival pattern compared to male and the patients with CD4>200 also had higher survival time compared to CD4 ≤ 200 counts. The Cox PH model and its extension models identified the covariates weight and age which are the important factors for the event our interest.

Among the different frailty models compared, the log logistic model had the lowest deviance value. The Weibull model also had very closer deviance value compared with loglogistic model. It indicates that log logistic seems to be better model compared with all the other models. The significance covariates CD4 and weights identify the heterogeneity in the patients.

MC errors in Bayesian Cox frailty model are less when compared to the Bayesian Cox model. It shows that the Bayesian Cox frailty model fits better for the data.

The gap time model shows the smallest deviance compared with other two counting process and marginal time models. Hence for the MDR-TB recurrent data, the gap time model fits better compared with the other models.
The typical “cause-specific” approach for analyzing competing risks data was performed a survival analysis for each event type separately, where the other (competing) event types are treated as censored categories.

The cumulative incidence function shows higher estimated value in HIV patients compared to TB patients and those with CD4 ≤ 200 counts had higher estimated values compared to CD4>200 in both TB and HIV groups.

**Topics for Further Research**

In this thesis, we performed the analysis using the survival statistical procedures where the work is required and discuss the results related to the HIV-TB and MDR-TB study applications. There are some areas where the researchers have not taken full attention using the statistical procedures and are to be extended. In some cases, the existing statistical procedures have to be extended and in others, new ideas are called for:

- Multivariate marginal models for survival data need further research.
- Marginal and dynamic models for recurrent events and clustered survival data and Bayesian approach for the above models require more research in this area.
- Frailty models and Generalized Additive models require lot of new ideas for exploring survival data.
- Work on hierarchical multivariate frailty models through MCMC methods require further research.
- Competing risks models where two or more causes operating on the same individual is not explored much. This area requires new ideas for tackling informative censoring and correlated risks.