Data-Driven Statistical Modeling and Analysis of the Survival Times of Multiple Myeloma Cancer.

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Abstract (300 word limit)

Multiple Myeloma (MM) cancer has been and continues to be the subject of many research studies. The main goal is to improve the therapeutic/treatment process of the survival of MM patients. Based on the 2012-2016 MM cases and deaths, the number of new cases was 6.9 per 100,000 men and women per year, and the number of deaths was 3.3 per 100,000 men and women per year. It is therefore imperative to research MM. In the present study, we proposed a data-driven statistical model for the survival time of 48 patients diagnosed with multiple myeloma as a function of 16 attributable risk factors. We are interested to know the causes of MM and the life span of MM patients given the risk factors associated with it. We identified 9 attributable risk factors out of 16 and one interaction term to be significantly contributing to the survival time. They are **Bence Jone protein in urine**, **blood urea nitrogen (BUN)/serum creatinine**, **infections**, **% myeloid cells in peripheral blood**, **fractures**, **serum calcium**, **gender**, **platelets and age**, and **white blood cells & total serum protein** an interaction term. The proposed model satisfied all the model assumptions, passes the residual analysis test and has very high prediction accuracy. Thus, it passes the goodness-of-fit test and the qualities of a good model. The identified significant attributable risk factors and the interaction has been ranked based on the percent contribution to the survival time. The proposed model was evaluated and compared with other existing models of survival of multiple myeloma. Our model is very accurate and also identifies some new significant risk factors of MM. The study offers an improved strategy for the therapeutic/treatment process of multiple myeloma cancer.

Image

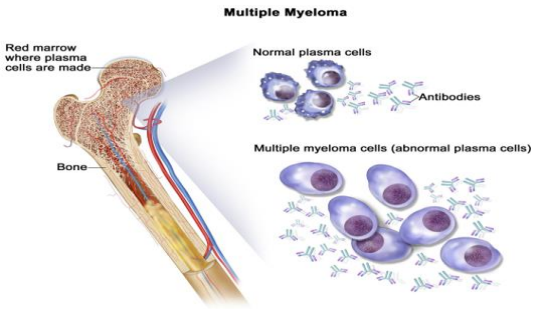


Figure 1: Development of the Myeloma Cell

Recent Publications (minimum 5)

1. Mamudu L, Tsokos CP (2020). "Data-Driven Statistical Modeling and Analysis of the Survival Times of Multiple Myeloma." Health Science Journal, Volume 14, IPHSJ-19-2974.
2. Mamudu L, Tsokos CP (2020). "Parametric and Non-parametric Survival Analysis of Patients with Multiple Myeloma." Open Applied Science Journal (OAppS), 2020.
3. Mamudu L, Tsokos CP (2020). "Survival Analysis of Multiple Myeloma Data Using the Cox-PH Model."
4. Mamudu L, Tsokos CP (2020). "Comparison of Survival Analysis of Semi-parametric Cox-PH Versus Survival Analysis of a Statistical Nonlinear Regression of the Survival Times of Patient with Multiple Myeloma."
5. Mamudu L, Tsokos CP (2020). "Data-Driven Statistical Modeling of Production Process of Corn in the United State."

Photograph



Biography (150 word limit)

Mr. Mamudu is a Doctoral Candidate and an instructor of records of the Department of Mathematics and Statistics at the USF, graduating in May 2021, and He is also a member of Rotary international at the Rotary Club of Tampa, Florida. Mr. Mamudu is passionate about improving the wellbeing of humans, especially the underprivileged, using His knowledge acquired in statistics to help solve and improve the lives of people in poor communities in Ghana and the world at large. His research is data-driven and focused on health science, Economics, Finance and Cybersecurity. His advisor is Dr. Tsokos, a renowned Distinguished University Professor at USF, President of IFNA Journal, Chief Editor and Fellow of American Statistical Association. Mr. Mamudu and His advisor have currently written five articles with two published and three accepted for publication. Mr. Mamudu is very critical about the quality of His research studies.

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Notes/Comments: