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COMPARING COX PROPORTIONAL HAZARDS MODEL AND PARAMETRIC MODELS FOR ANALYZING THE SURVIVAL OF PATIENTS WITH HEART FAILURE

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ABSTRACT

Heart failure is still a major global cause of morbidity and death, so assessing patient survival requires strong statistical tools. To investigate how long patients with heart failure live, this study compares the Cox Proportional Hazards (PH) model with common parametric survival models, including Exponential, Weibull, Log-logistic, Log-normal, Gamma, Gompertz, and Rayleigh. We start by checking the proportional hazards assumption of the Cox model using clinical data that covers patient demographics, comorbidities, and survival outcomes. Then, we explore how flexible and efficient the parametric models are for calculating hazard rates and survival functions. We compare the models based on fit metrics such as the Akaike Information Criterion (AIC). While the Cox PH model assumes less about the baseline hazard, our findings show that some parametric models offer better interpretability and predictive accuracy when their assumptions hold true. This comparison highlights the importance of picking the right model for survival studies. Using parametric methods can result in more precise risk assessment for heart failure prognosis.

KEYWORDS: *Akaike Information Criterion (AIC), Cox Proportional Hazard Model, Heart Failure, Parametric Models.*

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