Modeling Coronary Heart Disease Risk Based on Age and Quality of Life Indices Semiparametric Logistic Regression Using Truncated Spline

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Abstract

Coronary Heart Disease (CHD) remains one of the leading causes of mortality worldwide, influenced by various risk factors including age and individual quality of life. This study aims to predict the risk of CHD based on individual quality of life predictors including age, psychology, and social relationship. These factors represent both linear and non-linear effects on CHD risk. This study aims to predict the risk of CHD through biostatistical modeling based on Spline Truncated Semiparametric Binary Logistic Regression (STSBLR) method. The estimation results reveal that age has a positive effect on CHD risk (OR = 1.097), indicating that each one-unit increase in age raises the odds of CHD by approximately 9.7%. The psychological quality of life index exhibits a nonlinear association, where lower psychological scores are linked to higher CHD risk. Higher psychological and social quality of life tends to reduce the likelihood of CHD, although the effect varies across the range of the indices. The model achieved an in-sample AUC value of 84.7%, and an out-sample AUC value of 75.6%, indicating very good predictive performance. This study contributes to SDGs point 3, by providing a predictive framework for early detection and prevention of CHD in Indonesia.