



## Survival Analysis of patients with colorectal cancer in the presence of competing risks, using four-parameter log-logistic distribution

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### Abstract

**Introduction & Aim:** The prognosis of colorectal cancer is relatively good in terms of survival. In many prognostic studies, patients may be exposed to several types of competing events. These different causes of death are called competing risks. To investigate the prognosis factors of Survival of patients with colorectal cancer in presence of competing risks, using . four-parameter log-logistic distribution.

**Methods:** Total of 1054 patients with colorectal cancer, registered in cancer registry center of Research institute of Gastroenterology and Liver Disease (from 2004 to 2015), Taleghani hospital, Tehran, Iran entered to this study. The demographic and clinical features including; age at diagnosis, sex, family history of CRC, body mass index (BMI), tumor size and tumor site extracted from hospital documents. Analysis was performed using competing risks model and based on the Four-parameter log-logistic distribution and log-logistic distribution. The analysis was carried out using R software version 3.0.2. P-value less than 0.05 considered as significant.



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**Results:** Overall, 1054 CRC patients with completed data were included in the analysis. The median $\pm$  sd of survival time was  $92\pm 6.62$  months. 325 patients (30.8%) were died from CRC and 100 patients (9.5%) were died from other causes of death, such as myocardial infarction, stomach cancer, liver cancer, etc. Four-parameter log-logistic model and log-logistic model with competing risk analysis indicated age at diagnosis and BMI as the prognosis.

**Conclusion:** This study indicated age and BMI as the prognosis, using a Four-parameter log-logistic model with competing risk analysis. Also according to Akaike Information Criterion, the Four-parameter log-logistic model is the more appropriate for survival analysis.

**Keywords:** colorectal cancer, survival analysis, competing risks, four-parameter log-logistic distribution