

SURVIVAL ANALYSIS OF PEDIATRIC MORTALITY AND HOSPITAL STAY DURATION AT SBSCH, SRI LANKA

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Child survival is a key indicator of public health and socio-economic development, particularly in low- and middle-income countries. Understanding the factors influencing hospital stay duration and survival among pediatric patients are crucial for optimising clinical outcomes and healthcare resource allocation. While previous studies have examined pediatric survival, most have focused on specific conditions such as cancer. This study investigated survival outcomes and associated factors among pediatric admissions to the Sirimavo Bandaranaike Specialised Children's Hospital (SBSCH) over four years from 2019 to 2022. The dataset comprised 87,914 admissions, with variables including admission number, age, gender, admission and discharge dates, and mode of discharge. The data were complete and free of missing values. The event of interest was defined as patient death, and survival time corresponded to the hospital stay duration, measured in days from admission to discharge. Patients who remained admitted at the end of the observation period were treated as censored cases. Preliminary analysis revealed a marked decline in hospital admissions during the COVID-19 pandemic. Kaplan–Meier survival analysis showed that the probability of survival decreased over time, with 50% of the population remaining event-free up to 94 days. Survival curves varied significantly by disease and age categories, with the longest time to event observed among patients diagnosed with abnormal clinical findings. School-aged children, preschoolers, and adolescents demonstrated higher survival probabilities compared to other age groups. The proportional hazards (PH) assumption was assessed using Schoenfeld residuals: age ($p = 0.089$) and gender ($p = 0.829$) satisfied the assumption, while disease status violated it ($p < 0.05$), leading to an invalid overall Cox model ($p < 0.05$). A stratified Cox proportional hazards model was therefore fitted using age category, sex and disease category as stratification factors. The model's discriminative ability, assessed using Harrell's C-index, was 0.50, indicating no better performance than random prediction. Furthermore, toddlers and preschoolers exhibited significantly lower hazard rates compared to infants ($p < 0.05$). These findings highlight the importance of tailoring interventions to specific age groups and provide evidence-based insights to guide clinical decision-making and healthcare resource planning.

Keywords: Cox proportional hazards model, Kaplan–Meier, Pediatric admissions, Survival analysis, Time-to-discharge analysis