

UNIVERSITI TEKNOLOGI MARA

**EXPLORING THE SURVIVAL RATE
OF COLORECTAL CANCER
IN RELATION TO THE
INDIVIDUAL AND GEOGRAPHICAL
VARIATION IN MALAYSIA,
2013-2018**

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ABSTRACT

Colorectal cancer (CRC) is the third most common cancer and the second most deadly cancer globally. Despite advancements in CRC management, a marked disparity in CRC survival rates is still documented even in highly developed countries. Poorer CRC survival rates were found mainly in socioeconomically deprived areas and lack of healthcare accessibility. There is a lack of studies concerning geographical disparities in CRC survival in Malaysia. Hence, this study aims to determine the survival rate of CRC patients in relation to individual and geographical variation in Malaysia using the National Cancer Registry (NCR) database. This was a retrospective cohort study utilizing secondary data. All cases captured in the NCR database between 1 January 2013 and 31 December 2018 that fulfilled the inclusion criteria were included in this study. Survival analysis was conducted to determine the 5-year survival rate and factors that contribute to the overall CRC survival. Spatial analysis was carried out to identify the geographical areas with high priority for intervention. A total of 18,513 CRC patients were diagnosed between 2013 and 2018, with 10,819 deaths occurred during follow-up. The national 5-year CRC-specific survival rate was 42% with a median survival time of 36 months (95%CI 34.46-37.54). The East coast region (Kelantan, Terengganu and Pahang) had the lowest survival (38.0%). Among the 143 districts, eighty-one (56.6%) reported survival rates below the national average while sixteen (11.2%) were identified as high-priority districts. After adjusting for confounding variables in multilevel multivariable Cox proportional hazard regression analysis, the study found that older age (adjusted Hazard Ratio (aHR) 1.01, 95%CI 1.01-1.01), male gender (aHR 1.17, 95%CI 1.10-1.23), Malay (aHR 1.20, 95%CI 1.05-1.36) and other ethnicities (aHR 1.33, 95%CI 1.11-1.59), living in Peninsular Malaysia (Northern region [aHR 1.22, 95%CI 1.08-1.37], Central region [aHR 1.21, 95%CI 1.07-1.37], Southern region [aHR 1.37, 95%CI 1.22-1.54], East coast region [aHR 1.28, 95%CI 1.12-1.46]), rectal (aHR 1.11, 95%CI 1.04-1.18), rectosigmoid (aHR 1.10, 95%CI 1.02-1.19), and anal cancers (aHR 1.28, 95%CI 1.06-1.55), advanced disease stage (Stage III [aHR 2.40, 95%CI 2.05-2.80], Stage IV [aHR 6.70, 95%CI 5.75-7.81]), receiving other (aHR 2.12, 95%CI 1.56-2.87), none or delayed treatments (aHR 1.48, 95%CI 1.18-1.85), and living in less densely populated areas (Low [aHR 1.10, 95%CI 1.02-1.19] and Moderate [aHR 1.13, 95%CI 1.04-1.23]) were significantly associated with a higher risk of mortality ($p < 0.05$). This study identified several factors associated with CRC survival. Healthcare resource planning and service provision are closely aligned with the characteristics of specific local areas. Thus, we recommended area-based targeted interventions to improve cancer detection, management, and access to healthcare. Identifying the factors that influence the difference in survival rates across the region may help public health authorities to better plan healthcare delivery, and eventually, reduce disparities in CRC survival in Malaysia.

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CHAPTER ONE

INTRODUCTION

1.1 Preamble

This chapter provides the background of the study. Section 1.2 delves into the global burden of CRC, emerging trends, the geographical disparities in CRC survival, and from Malaysia's context. Section 1.3 presents the problem statement, highlighting the issues that need to be addressed by the research. Section 1.4 provides the rationale of the study, which justifies the need for the research. Section 1.5 outlines the research questions. Section 1.6 specifies the study's objectives. Finally, Section 1.7 states the research hypothesis.

1.2 Study Background

1.2.1 Global Burden of Colorectal Cancer

1.2.1.1 CRC Incidence and Mortality

Colorectal cancer (CRC) is a major public health challenge worldwide, ranking as the third commonest cancer and second leading cause of cancer-related deaths globally (Keum & Giovannucci, 2019; World Health Organization (WHO), 2023). It accounts for 10% of global cancer incidence and 9.4% of cancer deaths in 2021 (Sung et al., 2021). In 2020, more than 1.9 million new CRC cases and 930,000 deaths were estimated to have occurred worldwide. The global burden of CRC is expected to increase significantly, with projections indicating a rise to 3.2 million new cases (an increase of 63%) and 1.6 million deaths per year (an increase of 73%) by 2040 (Morgan et al., 2023).

The global burden of CRC is substantial, with significant disparities in incidence and mortality rates have been observed across different regions and socioeconomic groups, with incidence and mortality rates highest in Europe and lowest in Southern Asia. According to a study by the International Agency for Research on Cancer (IARC),