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**Survival Analysis of the Registered Colorectal Cancer  
Cases in the Gaza Strip**

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**Survival Analysis of the Registered Colorectal Cancer  
Cases in the Gaza Strip**

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## **Dedication**

To my beloved parents who always give us the power, encouragement, and guidance for everything is good.

To my wonderful lovely wife Mona for her endless support, she is a continuous source of motivation, support, love, and hope.

To my amazing son Qais and beautiful daughter Mais who give me bright hope for tomorrow.

To my teachers in school, nursing college, and public health college for their efforts to be active person in our societies.

To my all friend and my all colleagues in the work.

To everyone had help me and contributed to finish this study.

**Murad B. Alrun**

## **Declaration**

I certify that this thesis submitted for the degree of Master, is the result of my own research, except where otherwise acknowledged, and that this study (or any part of the same) has not been submitted for a higher degree to any other university or institution.

**Signed:**

**Murad Basher Alrun**

**Date:**

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## Abstract

*Colorectal Cancer (CRC) is the first major common cancer among men in Gaza Strip (GS) and it is considered the second common cancer after breast cancer for both sexes combined. Survival analysis for CRC cases is essential for monitoring and evaluation of health care system effectiveness in managing and fighting CRC. This non-concurrent prospective study was conducted to analyze the survival data for CRC cases who were diagnosed in the period 2008-2010, and to give estimates about overall survival rate, disease free survival rate, progression free survival. Beside exploring main factors may affect on survival rates for CRC in GS.*

*After some cases were excluded due to various causes, 207 cases were eligible for this study. The main source for data was the medical records for the cases, and data analysis was conducted by using SPSS program version 22. Kaplan-Meier method was used to provide overall survival estimates, survival estimates adjusted to selected prognostic factors and survival curves for subgroups, while the log rank test was used to assess survival differences between the subgroups. Cox regression survival analysis was used to examine the independent effect of study variables on survival data and to estimate the hazard ratio. Statistical significance was defined as  $P < 0.05$ . The study findings showed that CRC incidence rate in Gaza Strip (GS) was 14/100000 in the study period (2008-2010).*

*Findings regarding socio-demographic characteristics of study population revealed that the mean of age at diagnosis for cases was 59.6 years, incidence rate among male is slightly higher than female (Male:54.6%, female:45.6%), 16.4% of cases were unmarried at time of diagnosis, while data about education level and work were missed from the majority of medical records. All cases presented with signs and symptoms at time of diagnosis. The common signs and symptoms were bleeding per rectum and abdominal pain 63.3%, 35.3% from all cases respectively. The most common histological type was Non-mucinous adenocarcinomas which accounted 86.7%. More than two third of cases were diagnosed with low grade tumor (grades 1, 2), while more than the half of patients (61.6%) were diagnosed with advanced stages (III, IV). Left-sided colon is the most common site for developing CRC with 52.3% of all cases. It followed with rectal cancer with 25.9%, while right-sided colon accounted only 21.9%. The study revealed that 5-year observed overall survival rate, disease free survival rate, and progression free survival rate probabilities to be 45%, 59% and 19% respectively.*

*According univariate analysis (log rank test) survival rate was significantly affected by co-morbidity status ( $P$ -value: 0.040), smoking ( $P$ -value: 0.002), stage at diagnosis ( $P$ -value $<$  0.001), tumor grade ( $P$ -value=0.41), tumor site ( $P$ -value=0.004), and treatment type ( $P$ -value=0.001). While the multivariate analysis (Cox regression) showed that only three prognostic factors had statically significant effect which were stage at diagnosis ( $P$ -value $<$ 0.001, 95%CI 2.673-9.034), Co-morbidity status ( $P$ -value=0.031, 95%CI, 0.434-0.962) and tumor site ( $P$ -value0.018, 95%CI, 0.373-0.912). Factors such as main treating hospital, diagnostic delay, treatment delay and place, sites of distant metastasis, gender, age, residency, or family history of cancer were found to be without statically significant effect on survival data for CRC cases in GS.*

*According the current study results, 5-years survival estimates in GS is poorer than the estimates in the developed countries, which were between 60-70% there. However, they are in line with most the estimates in the Arabic countries where the survival rates between 30-50%.*

*The study concluded that the absence of a national CRC screening program, poor public awareness and official attention, and absences/shortage of many cancer services in GS may be the main causes for poor CRC survival estimates. Decreasing gaps in the last three issues may contribute to enhance the survival data, prevent premature deaths, and promote the quality of life for CRC cases in GS.*

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## List of Abbreviation

<b>ACS</b>	American Cancer Society
<b>CBC</b>	Complete Blood Cell
<b>CRC</b>	Colorectal Cancer
<b>CT</b>	Computed Tomography
<b>CEA</b>	Carcinoembryonic Antigen
<b>DFS</b>	Disease Free Survival
<b>DRE</b>	Digital Rectal Examination
<b>EGH</b>	European Gaza Hospital
<b>FAP</b>	Familial Adenomatous Polyposis
<b>GG</b>	Gaza Governorates
<b>GS</b>	Gaza Strip
<b>HNPCC</b>	Hereditary Non-Polyposis Colorectal Cancer
<b>IARC</b>	International Agency for Research on Cancer
<b>MOH</b>	Ministry of Health
<b>MRI</b>	Magnetic Resonance Imaging
<b>NCI</b>	National Cancer Institute (American)
<b>NGOs</b>	Non Governmental Organizations
<b>NIH</b>	National Institutes of Health (American)
<b>OS</b>	Overall Survival
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>PCR</b>	Palestinian Cancer Registry
<b>PFS</b>	Progression Free Survival
<b>PHIS</b>	Palestinian Health Information System
<b>RSPH</b>	Rantesi Specialist Pediatric Hospital
<b>SoP</b>	State of Palestine
<b>TNM</b>	Tumor size, Lymph node, Metastasis
<b>UK</b>	United Kingdom

<b>UNRWA</b>	United Nations Relief and Works Agency for the Refugee of Palestine in the Near East.
<b>USA</b>	United States of America
<b>Wafa</b>	Palestine News & Information Agency West Bank
<b>WB</b>	West bank
<b>WHO</b>	World Health Organization