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Survival Rates and Associated Factors in Gastric Cancer Patients in Sagheze City, Kurdistan Province: A Study from 2010 to 2018

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A B S T R A C T

Introduction: Gastric Cancer ranks as the fourth most common cancer globally, with the second highest mortality rate. Given its significance, this study aims to ascertain and explore the 1-5-year survival rates of patients diagnosed with Gastric Cancer.

Material & Methods: This descriptive analytical study examines data from patients diagnosed with Gastric Cancer in Sagheze city, Kurdistan province, spanning from 2010 to 2018. Data from 236 patients with confirmed Gastric Cancer diagnoses, including demographic information, date of diagnosis, tumor morphology, tumor site, and tumor stage, were collected from the Cancer Registry Center at Kurdistan University of Medical Sciences and the Digestion and Liver Research Center at Tohid Hospital in Sanandaj. The data were then analyzed using SPSS 22 software, employing survival analysis based on the Kaplan-Meier method, the Log-rank test statistic, and Cox regression.

Results: Of the patients, 159 (67.4%) were male, with a mean age at diagnosis of 68.46±15.50 years. Tumor morphology varied, with 132 (55.9%) categorized as unspecified neoplasms, 39 (16.5%) as invasive types, 35 (14.8%) as adenocarcinomas, 22 (9.3%) as intestinal types, and 8 (3.4%) as diffuse types. Gender (p=0.190), tumor site (p=0.084), and tumor stage (p=0.739) showed no significant relationship with the 1-5-year survival rate. However, age at diagnosis (p>0.001) and tumor morphology (p>0.001) were found to influence survival rates, which were estimated at 43%, 40%, 39%, 39%, and 36% for years 1 to 5, respectively.

Conclusion: Age at diagnosis, tumor site, tumor morphology, tumor differentiation, and treatment type emerge as crucial factors influencing disease prognosis and patient survival.

Keywords: Gastric Neoplasms, Survival Rate, Kaplan-Meier Estimate, Tumor, Neoplasms

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Introduction

Gastric Cancer refers to the uncontrolled growth and proliferation of malignant cells in the epithelial layer (mucous layer) of the stomach. Among all cancers, it is the fourth most common cancer regarding prevalence, and the second most fatal cancer worldwide. According to global estimations, annually more than 930,000 new cases of Gastric Cancer are diagnosed, and at least 700,000 deaths occur due to this disease (1). Globally, there is significant diversity in the incidence of Gastric Cancer among and even within countries. In Japan, Korea, and China, which are regions with a high risk of Gastric Cancer incidence, the age-standard incidence rate has been estimated to be 20 per every 100,000 population (2-5). The highest rate of incidence of Gastric Cancer has been observed in eastern Asia; in China and Japan, it has been 35 per 100,000, while in the US it is 5 per 100,000 (6).

According to the report by the Institute of Cancer and the Center for Fighting Diseases of the Health Ministry, Gastric Cancer in Iran is the most common among men and the third most common cancer among women following breast cancer and colon cancer. Furthermore, according to this same report, the incidence of Gastric Cancer has been growing over the last three decades, and it is the most fatal cancer throughout Iran. This cancer has a high prevalence in the north and northwest of the country, moderate incidence in central and western provinces, and low prevalence in southern and eastern provinces (5). According to the report of the annual status of noncommunicable diseases by Kurdistan University of Medical Sciences, Sagheze city, as the second most populated city of the province located in the northwest of the country, with the annual incidence of 23 per 100,000, claims the largest incidence rate of Gastric Cancer in the province (5, 6).

The signs and symptoms of Gastric Cancer include unjustified weight loss, anorexia, vague indigestion symptoms such as a sense of fullness, a sense of early satiety, nausea, and vomiting. The main treatment for Gastric Cancer in the primary stages is surgery because it separates the disease from the patient. The role of surgery in Gastric Cancer treatment ranges from biopsy to pathology diagnosis, preventing relapse by removing the lesions that can potentially become cancerous in the future, removing local tumors, reducing the size of cancerous tumors, and removing metastasis to support definitive treatment. Although surgery is the only definitive treatment for Gastric Cancer, following surgery, there is still a possibility of relapse either locally or as metastasis. Thus, currently, huge attempts are made for practicing systemic and local treatments before and after tumor surgery. In the advanced stages of the disease, surgical operations, radiotherapy, and chemotherapy are also used for treatment, though they are not associated with good outcomes (7-8).

Among the factors affecting the survival of patients are age, stage of the disease, and the existence of metastasis. Investigations show that surgery is one of the influential factors to enhance the survival of patients (9-10).

The five-year survival rate of patients with Gastric Cancer in Switzerland, China, France, and the USA has been 33%, 27%, 22%, and 37%, respectively. This difference might be due to the different quality of services and the level of access to welfare facilities (11).

In Iran, various studies have been performed regarding the survival of patients with Gastric Cancer. For instance, in the study by Biglarian et al., from 1996 to 2003 at Fayazbakhsh Hospital in Tehran, the median longevity of patients was determined to be 4.2 months, and the seven-year survival rate was 17.2%. The median longevity for patients with local and metastatic development of the disease was 18.2 and 8.3 months, respectively, while for the patients undergoing surgery, it was 17.7 months. Finally, for patients who did not undergo surgery, it was 14.2 months (9). In another study by Dehkordi in 2005 in Fars province, the mean survival of patients was determined to be 22.56 months, where

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the one-, two-, three-, four-, and five-year survival rates of these patients were obtained as 57%, 32%, 25%, 21%, and 16%, respectively (19). Also, in a study by Roshanaei et al. in Imam Khomeini Hospital published in 2010, the 1-, 3-, and 5-year survival rates of the patients were 81%, 41%, and 3%, respectively (23).

One of the main reasons highlighting the importance of survival in patients with Gastric Cancer is the active and progressive nature of this disease, coupled with the increasing number of deaths it causes. Despite advances in diagnostic facilities and methods, this disease remains the second most fatal cancer in the world. Considering the relatively limited number of studies conducted on the survival of patients in Iran, and recognizing the histologic diversity of the disease across different regions, along with the fact that the disease is typically diagnosed at advanced stages (III or IV), which are often incurable.

Certainly, determining the survival of patients with stomach cancer can assist doctors and researchers in providing diagnostic and therapeutic solutions, as well as educational interventions. Given the high prevalence of stomach cancer in Iran, particularly in Sagheze city, the aim of this study is to determine the survival of 15-year-old patients with stomach cancer and its related risk factors in Sagheze city, Kurdistan province. This research aims to serve as a guide for health policymakers and researchers in this field.

Materials and methods

This study was conducted retrospectively on 236 patients with Gastric Cancer residing in Sagheze city, who received a definitive diagnosis at the pathology center between 2010 and 2018, as reported by the Center for Recording Cancer at Kurdistan University of Medical Sciences.

All stages of the project were performed in coordination with Ilam and Kurdistan University of Medical Sciences. The conductance of this proposal was approved by the ethics committee of Ilam University of Medical Sciences with the ethics code of IR.MEDILAM.REC.1397.62, ensuring that the study results are published in general.

The source of data was the pathology files of the patients. Using the medical records of the patients, demographic characteristics, date of cancer diagnosis, type of tumor histopathology, degree of tumor differentiation, stage of the disease, site of the tumor, and type of treatment were collected. Subsequently, utilizing the demographic characteristics and the patients' residential addresses, their survival was tracked based on recorded death cases in the healthcare center of the city. Data were extracted from the patients' medical records, and the latest health status of the patients was obtained through phone calls and recorded in prepared checklists. The survival of patients was measured from the time of diagnosis until death or by the end of this study on a monthly basis, with those who could not be followed up for any reason being considered as censored (missed).

The data were analyzed using survival analysis methods, including Kaplan-Meier and Cox proportional-hazards model, which is one of the most important models in survival data analysis. The application of the Cox model requires that the assumption of hazard proportionality holds. To assess the proportionality of Cox hazards, the Schoenfeld residuals method was employed. In the Schoenfeld model, the Schoenfeld residuals provide an estimation of the ith component of the effect rank for the jth parameter of the model. When the proportional hazards model holds, the Schoenfeld residuals diagram exhibits a random distribution throughout the study period.

Analysis of the collected data was conducted using SPSS 22 and further interpreted through survival analysis methods, including actuarial life table, Kaplan-Meier survival analysis method, and the log-rank test. The Cox proportional hazards regression model was utilized to establish a suitable model for

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predicting the effect of variables on the survival rate, with a significance level set at less than 0.05.

Results

According to Table 1, the patients comprised 159 (67.4%) men with a mean age of diagnosis of 68.46±15.50 years, while 77 (32.6%) were women. Morphologically, 132 (55.9%) were of unspecified neoplasm, 39 (16.5%) were invasive adenocarcinoma, 35 (14.8%) were adenocarcinoma (AC), 22 (9.3%) were intestinal adenocarcinoma, and 8 (3.4%) were diffuse adenocarcinoma.

Table 1 illustrates the mean survival rate of Gastric Cancer patients in terms of gender between 2010 and 2015 in Sagheze city. The frequency was higher in men (n=159, 67.4%) than in women. Regarding the mean survival of patients, men had a longer average survival of 47.23 months (39.57-54.9). The log-rank statistic indicated that gender cannot be a predictor variable for the survival of patients (0.19).

Table 1. Mean Survival Estimates by Gender for Patients with Gastric Cancer in Sagheze City, 2010-2018.

Variable		Frequency (N)	5 year average survival (95% CI) (Year)	P (log-rank test)
Sex	Male	159 (67.4)	47.23 (39.57-54.9)	0.19
	Female	77 (32.6)	37.27 (27.27-47.27)	

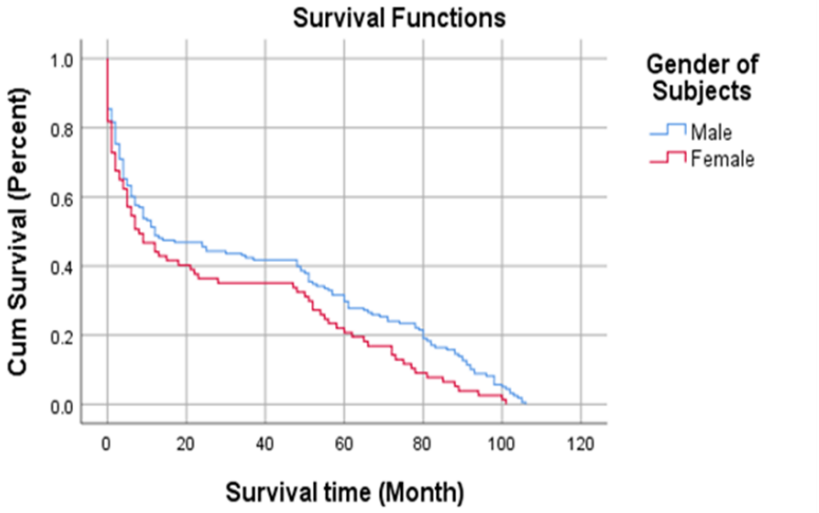


Figure 1. Five-Year Survival Rate by Gender for Patients with Gastric Cancer in Sagheze City, 2010-2018

Figure 1 illustrates that the survival rate does not exhibit any significant difference between men and women (log-rank=0.19).

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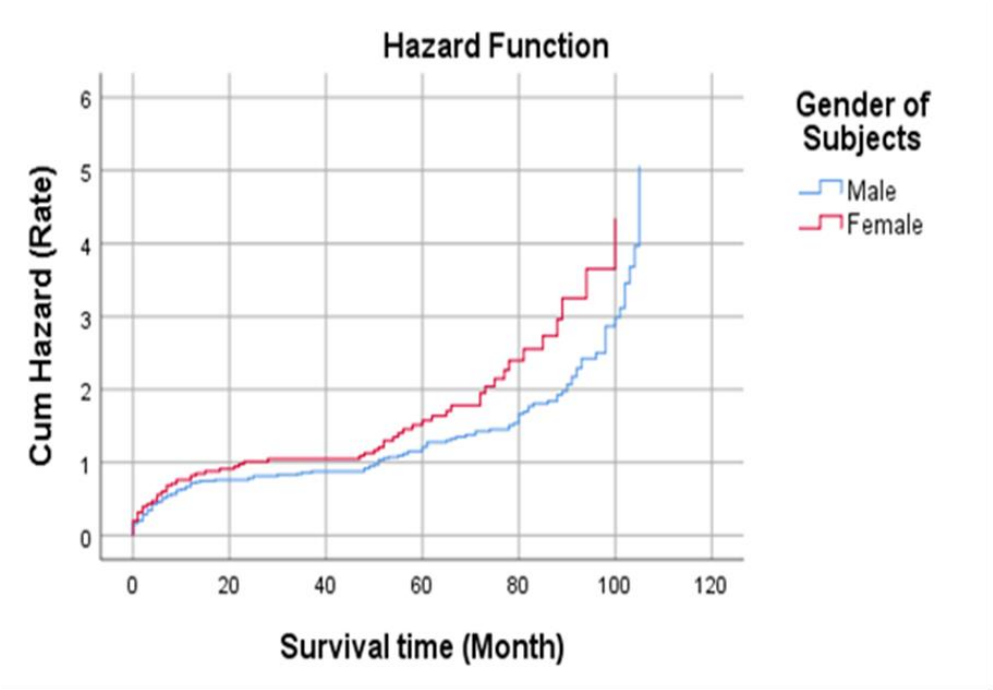


Figure 2. Hazard Function by Gender for Patients with Gastric Cancer in Sagheze City, 2010-2018

The hazards function diagram for the patients (Figure 2) indicates that over time, the extent of hazard has increased, with a greater increase observed in women compared to men.

Table 2. Mean and Median Survival Estimates by Place of Residence for Patients with Gastric Cancer in Sagheze City, 2010-2018.

Location	Average (month)				Average (month)			
	Estimated	SD	CI 95 %		Estimated	SD	CI 95 %	
			Upper	Down			Upper	Down
City	77.849	2.831	83.398	72.301	81.733	6.22	93.924	69.543
Village	75.097	2.698	80.384	69.810	73.933	4.161	82.089	65.778
Total	76.690	1.199	80.591	72.789	78.2	4.088	86.213	70.187

Table 2 presents the mean and median survival of patients with Gastric Cancer based on their place of residence in Sagheze city between 2010 and 2018. The mean survival rate was higher among city-dwellers, with a value of 77.839 months (72.301-83.398), compared to villagers, who had a mean survival rate of 75.097 months (69.810-80.384). In terms of median survival, city-dwellers had a longer survival of 81.733 months (69.543-93.924) compared to villager patients, who had a median survival of 73.933 months (65.778-82.089). The log-rank statistic indicates that place of residence cannot be a predictor variable for the survival of patients (0.146).

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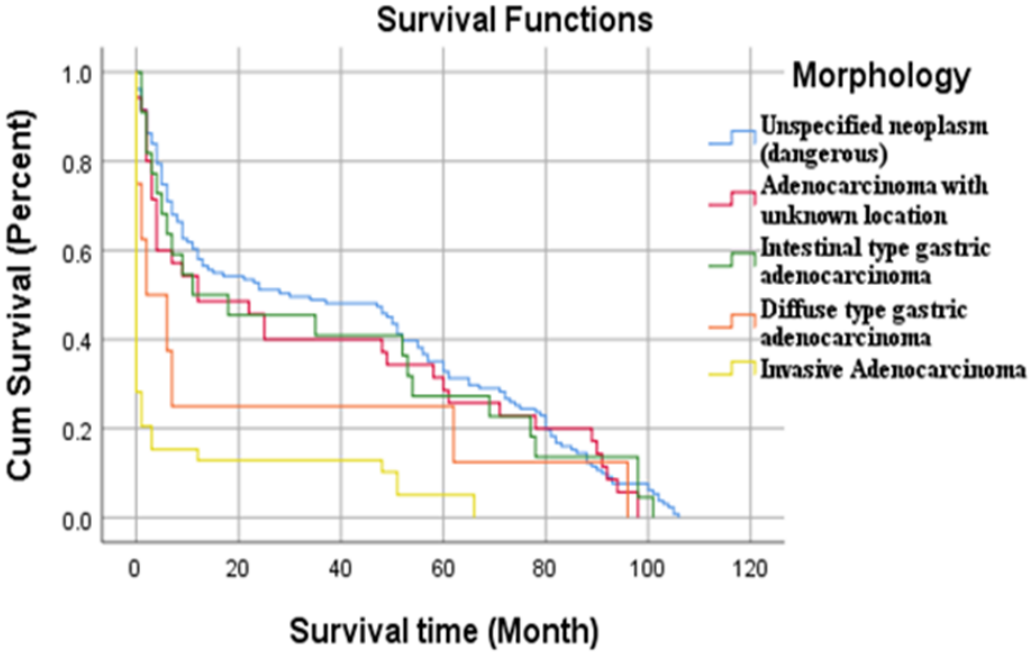


Figure 3. Cumulative Survival Curve by Tumor Morphology for Patients with Gastric Cancer in Sagheze City, 2010-2018, Using the Kaplan-Meier Method

Figure 3 illustrates that over time, the extent of survival has decreased, with a higher survival rate observed among city-dwellers compared to villager patients.

Table 3. Frequency and Mean Five-Year Survival by Tumor Morphology for Patients with Gastric Cancer in Sagheze City, 2010-2018.

Tumor morphology	Frequency (N)	5 year average survival (95% CI) (Month)	P (log-rank test)
Dangerous unknown neoplasm	132	53.88 (45.5-62.2)	<0.001
Invasive adenocarcinoma	39	9 (2.11-15.88)	
Unknown adenocarcinoma	35	43.37 (28.46-58.28)	
Intestinal type	22	43.69 (25.1-62.28)	
Diffuse adenocarcinoma type	8	26 (0.02-54)	

According to Table 3, regarding the morphology of the tumor, the highest frequency is attributed to unspecified neoplasm (n=132, 55.9%). In terms of the mean survival of patients, the highest mean survival was associated with unspecified neoplasm (53.88 months), while the shortest mean survival was linked to invasive adenocarcinoma. The log-rank statistic indicates that tumor morphology type can be a predictor variable for the survival of patients ($p < 0.001$).

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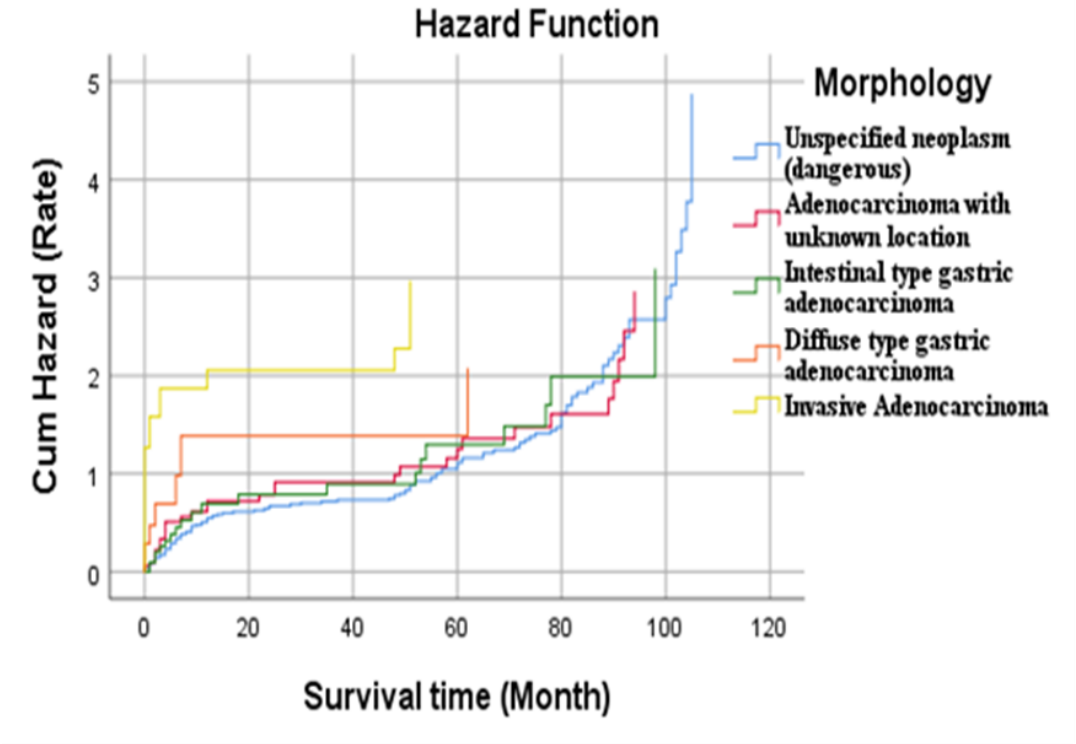


Figure 4. Cumulative Hazards Curve by Tumor Morphology Type for Patients with Gastric Cancer in Sagheze City, 2010-2018

Figure 4 suggests that the difference in the survival rate is notably greater in the unspecified neoplasm type compared to other types (log-rank < 0.001).

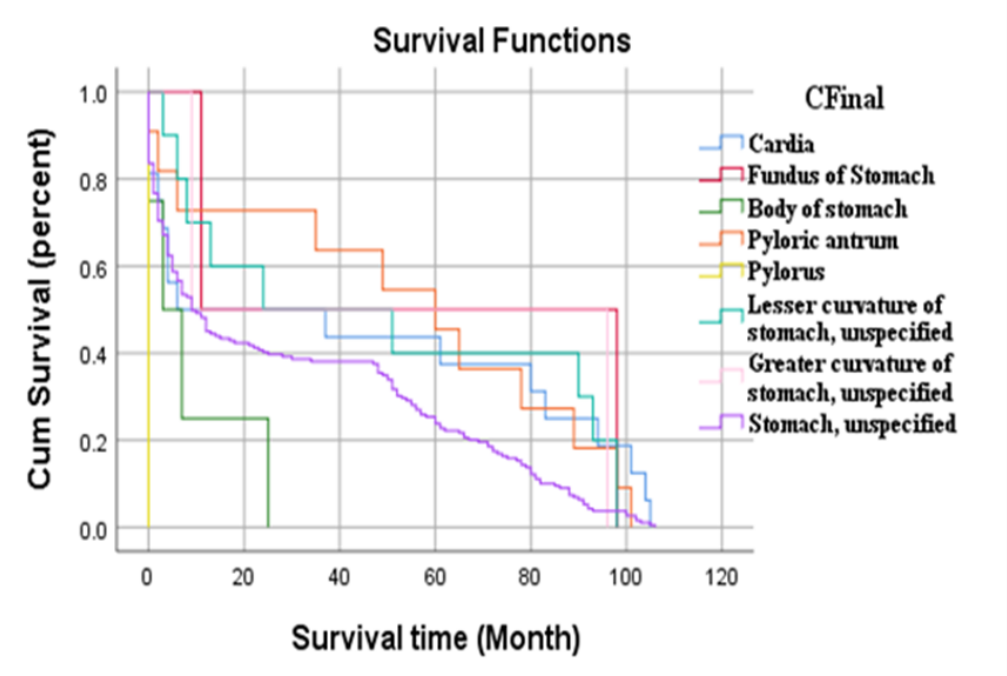


Figure 5. Cumulative Survival Rate by Tumor Site Using the Kaplan-Meier Method for Patients with Gastric Cancer in Sagheze City, 2010-2018

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The hazards function diagram of the patients (Figure 5) indicates that over time from the diagnosis, the extent of hazard increases, with a higher hazard observed in patients with the invasive type compared to other types.

Table 4. Frequency and Mean Survival by Tumor Site for Patients with Gastric Cancer in Sagheze City, 2010-2018.

Tumor morphology	Frequency (N)	5 year average survival (95% CI) (Month)	P (log-rank test)
Cardia	2	49.43 (73.79-25.05)	<0.084
Fundus	4	54.5 (114.78-0.000)	
Stomach trunk	11	8.75 (19.73-0.000)	
Pylor Valve	1	68.18 (94.33 – 42.03)	
Pylorus	10	0	
Small gastric curvature	2	54.4 (81.61-27.18)	
Large curvature of the stomach	190	52.5 (112.78-0.000)	
Unknown	2	42.35 (49.23-35.47)	

According to the results (Table 4), the mean survival was higher in patients whose tumor was located in the pyloric orifice, with a value of 68.18 months (42.03-94.33). The maximum frequency for stomach tumor was related to an unspecified site (190). The log-rank statistic indicates that tumor site cannot be a predictor variable for the survival of patients (0.084).

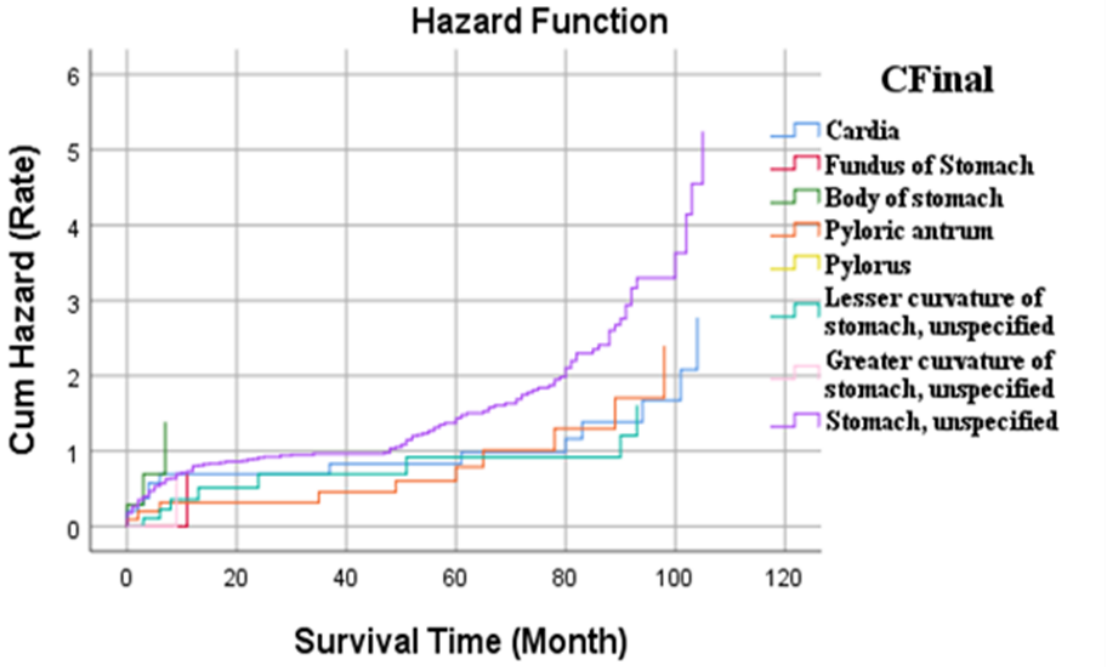


Figure 6. Cumulative Hazard Value by Tumor Site for Patients with Gastric Cancer in Sagheze City, 2010-2018

Figure 6 illustrates that the tumor site cannot be a predictor factor for the survival of patients with Gastric Cancer (log-rank=0.084).

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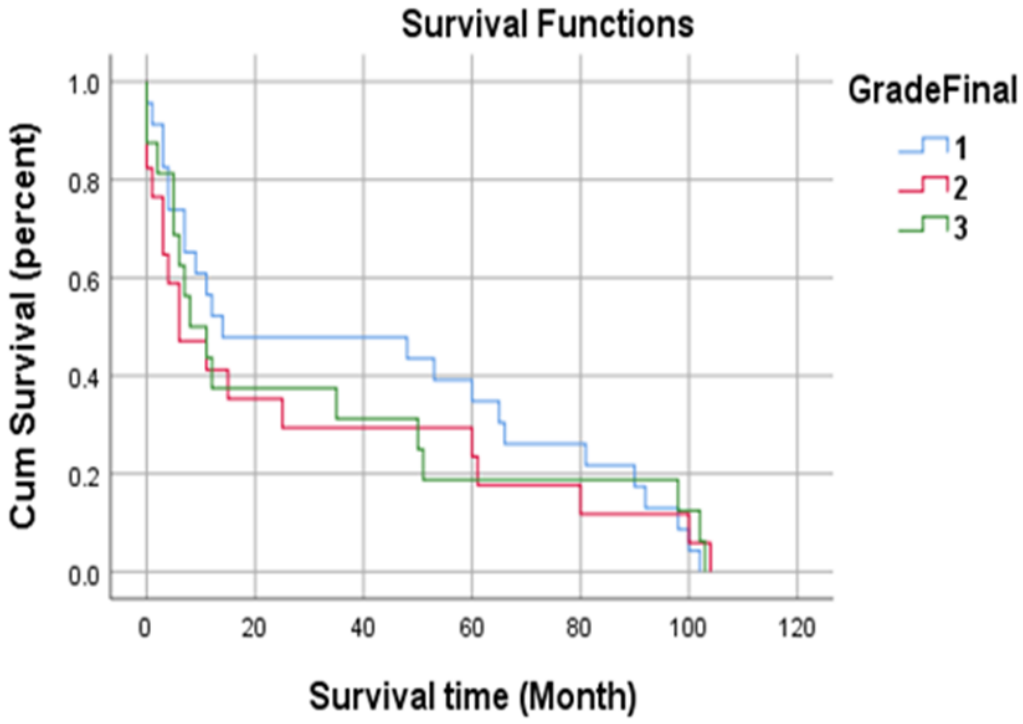


Figure 7. Cumulative Survival Value by Histologic Grade Using the Kaplan-Meier Method for Patients with Gastric Cancer in Sagheze City, 2010-2018

The hazards function in Figure 7 for the patients reveals that over time from the diagnosis of the disease, the hazard level increases, with a higher hazard observed in tumors located in the stomach fundus compared to other sites.

Table 5. Frequency and Mean Five-Year Survival by Histologic Grade for Patients with Gastric Cancer in Sagheze City, 2010-2018.

Tumor grade	Frequency (N)	5 year average survival (95% CI) (Month)	P (log-rank test)
Weak (1)	23	49.81 (68.9-30.72)	<0.739
Medium (2)	17	34.94 (56.32-13.55)	
Good (3)	16	37.87 (59.71-16.03)	
Indistinguishable (9)	179	45.01 (52.18-37.84)	

According to the results in Table 5, tumors with poor, moderate, good, and unspecified grades accounted for 23, 17, 16, and 179 cases, respectively. The highest frequency was related to the non-differentiated grade. The mean survival was higher in patients with poor grade than in those with moderate and good grades, with a value of 49.81 months (30.72-68.90). The log-rank statistic shows that histologic grade cannot be a predictor variable for the survival of patients (0.739).

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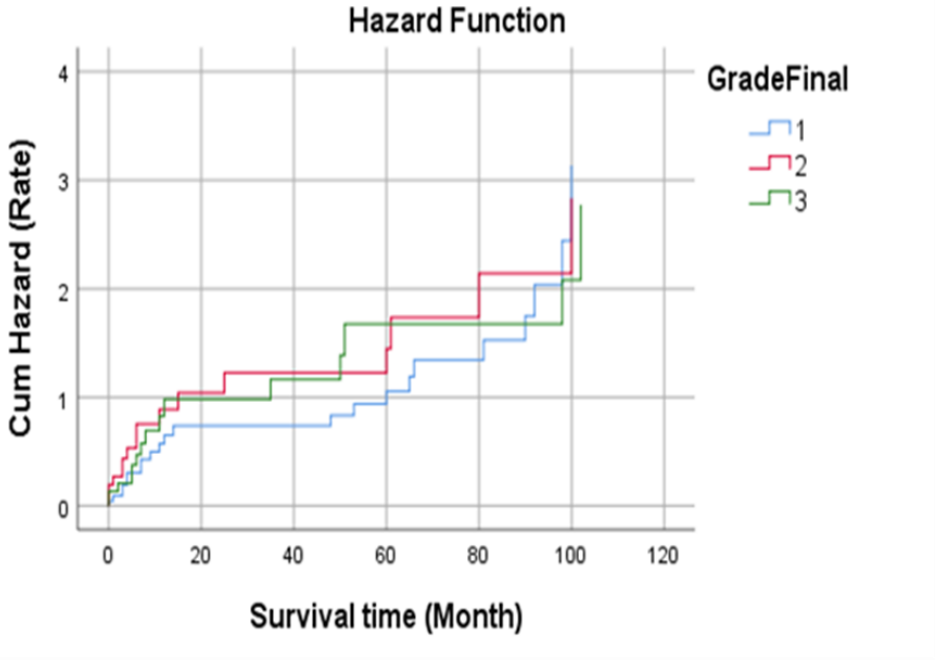


Figure 8. Cumulative Hazard Value by Histologic Grade for Patients with Gastric Cancer in Sagheze City, 2010-2018

Figure 8 reveals that histologic grade cannot be a predictor variable for the survival of patients (log-rank=0.739).

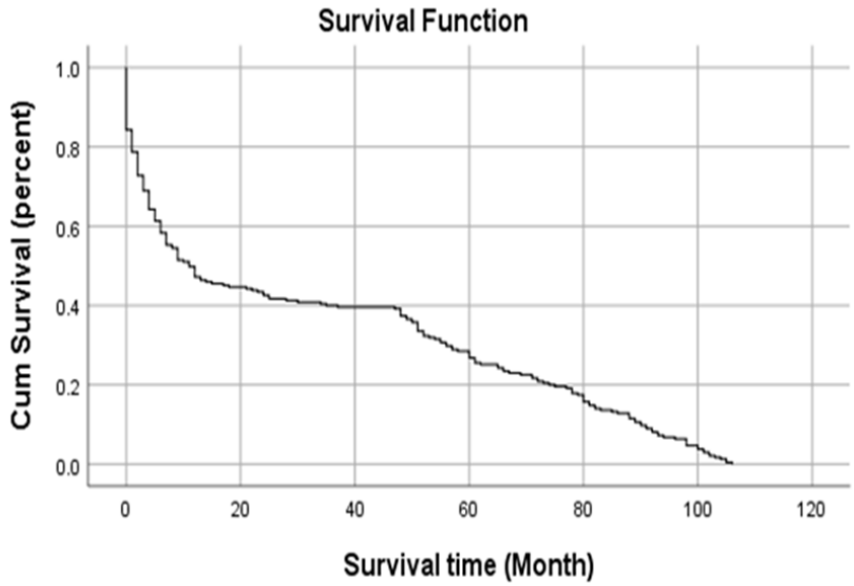


Figure 9. 1-5-Year Survival of Patients with Gastric Cancer in Sagheze City, 2010-2018

The hazard function diagram in Figure 9 shows that over time from the disease diagnosis, the extent of hazard increases, with a higher hazard observed in moderate-grade tumors compared to poor and good-grade tumors. Results of this study also showed that over time, the 1-5-year survival of patients with Gastric Cancer in Sagheze city between 2010 and 2018 has decreased.

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In order to assess the proportionality of Cox hazards, the Schoenfeld residuals method was utilized, which was not rejected based on the results of the Cox hazards proportionality assumption (p=0.55, ch2=3.01). Hence, Cox regression was employed for the analysis. According to the results, male gender was associated with a 2.89-fold increase in the hazard of diminished survival rate (p=0.001). The increase in the grade of tumor among patients resulted in an elevated hazard, with grade II compared to grade I causing a 61% increase in the hazard. Additionally, grade III compared to grade I showed a 37% greater hazard. However, the increase in hazards associated with the disease grade was not statistically significant.

Table 6. Regression Analysis Results of Variables Related to Survival in Patients with Gastric Cancer in Sagheze City, 2010-2018.

Variable		β	HR (CI95%)	P-value
Gender	**(Man)**	1.06	2.89 (1.31-6.33)	
Morphology	**Unknown neoplasm (dangerous)**	-	1	-
	Unknown adenocarcinoma	-0.415	0.66 (0.21-1.99)	0.461
	Intestinal adenocarcinoma	0.463	1.58 (0.45-5.49)	0.465
	Disseminated adenocarcinoma	0.926	2.52 (0.17-36.2)	0.495
	Invasive adenocarcinoma	0.186	1.2 (0.38-3.78)	0.749
Tumor grade	**1**	-	1	-
	2	0.467	1.61 (0.64-4.03)	0.311
	3	0.315	1.37 (0.54-3.43)	0.502
Tumor location	**Pylor Valve**	-	1	-
	Fundus	-0.896	0.4(0.03-4.82)	0.477
	Small gastric curvature	-0.193	0.82 (0.1-6.29)	0.853
	Cardia	0.066	1.06 (0.14-8.16)	0.950
	Unknown	0.177	0.83 (0.16-4.39)	0.834
	Trunk	0.967	2.63 (0.32-21.6)	0.369

Discussion

Gastric Cancer remains the second most fatal cancer in the world; according to global estimations, annually around 1 million new cases of Gastric Cancer are diagnosed worldwide (1). Statistics reported from Iran also indicate a high prevalence of this cancer in the country. Reports from the Center for Fighting Disease in the Ministry of Health indicate that Gastric Cancer is the first and third most common cancer among Iranian men and women, respectively, following breast and colon cancer. Considering the relatively sparse studies conducted in Iran regarding the survival of patients and the diverse histology of the disease across different regions, and as this disease is typically diagnosed in its progressive stages of grade III or IV, i.e., incurable, the present study aims to determine the survival of patients with Gastric Cancer and its associated risk factors in Sagheze City.

In this study, the mean age of the patients with Gastric Cancer was 66.43±12.49 years, which corresponds to the studies by Visani (68.8), Moradi (64.7), Biglarian (63.3), Barfei (61.8), and Europe (66,8 years). The male to female ratio here was 2.06, which is congruent with the studies done in Iran and

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abroad, mostly reporting 2-3 gender ratio (3, 14, 15, 19, 23, and 24). Indeed, the results of this study indicated that the disease is more common in men and among the elderly.

In a review study performed abroad, the male to female ratio was reported as 2:1 (14). However, the studies conducted in the USA, Iran plus Tehran Province, and Shiraz Province have reported 1.5, 3, and 2, respectively (14, 15, 19) thus confirming the results of the present study.

Based on the study by Roshanaei et al. (23), it was reported that the age of diagnosis was lower by around 5 ages among women than in men. Thus, the risk of mortality has been mentioned to be lower for women than for men. Note that age is an influential factor for the survival of patients with Gastric Cancer, where a higher risk was observed for those above 60 by 3 times as large for younger individuals (23).

In the meta-analysis by Akhondzadeh et al. (16) concerning the high heterogeneity obtained in the study, the authors, examining the subgroups, found that the survival of patients is lower in northern regions of the country. Also, the investigations obtained from analyzing the subgroups based on the mean age showed that with an increase in the average age of the patients, their longevity decreased, which is in line with the results obtained in developed countries including USA, UK, Sweden, and the Netherlands (16). This suggests that the longevity of patients was lower among the elderly than among the youth. This demonstrates that those who refer at younger ages for diagnostic and therapeutic measures have a higher longevity, as late diagnosis results in disease progression and diminished effect of therapeutic measures (16).

Based on the study by Paknazar et al. (26), age at the time of disease diagnosis was recognized as a strong prognostic factor, and significantly more survival was observed in younger age groups (26).

The mean survival of patients in this study was obtained as 44.56 months, which is larger than the result of most studies in Iran and abroad with the mean survival range of 20-41 months (3, 11, 14, and 15). However, it is smaller than the mean survival obtained by Roshanaei et al. (49 months) (23). The median survival of patients was estimated as 11 months, which is lower than the result obtained by Biglarian (14.2 months), Roshanaei (27 months), and Barfei (14.5 months) (9, 23, and 24).

The 1, 3, and 5-year survival rates of patients in this study were higher than in other studies conducted in the country. The 1-year survival was 43%, which is in line with Visani (41%) and Moradi (43%). However, it is smaller than the meta-analysis by Akhondzadeh (57%), Roshanaei (85%), Barfei (59%), Baeradeh (61%), China (54%), and Europe (48%) (3, 12, 16, 23, 24, 15, 14, 18). The lower survival rates may stem from the fact that the patients tested in Sagheze may have been in the advanced stages of the disease, and as such, there is a slim chance for their treatment and improvement.

The differences between the studies in Iran and abroad are due to the different healthcare indicators across different countries. Note that the state of the disease and its diagnosis are also important factors in the survival of patients. Such a situation in terms of screenings is very different in developed countries compared to Iran and is considered more seriously (20, 21, 22).

The 3-year survival was determined as 39%, which is larger than most studies (3, 23, 15, 16, 17). However, it was lower than the study by Roshanaei (41%) (23). The 5-year survival was obtained as 36%, which is larger than the results of most studies both in Iran and abroad (3, 12, 14, 15, 16, 18, 23).

In this study, 236 patients with Gastric Cancer diagnosed between 2010 and 2015 and reported in the Center for Cancer Registration of Kurdistan province were investigated. The mean age of the patients was 68.46±15.50 years with an age range of 18-113 years. A total of 159 (67.4%) patients were male and 77 (32.6%) were female. After follow-up, 147 (62.3%)

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died and 89 (37.7%) survived. In terms of tumor morphology, 132 (55.9%) had unspecified neoplasm, 39 (16.5%) had invasive adenocarcinoma, 35 (14.8%) had adenocarcinoma (AC), 22 (9.3%) had intestinal adenocarcinoma, and 8 (3.4%) had diffuse adenocarcinoma. The tumor degree of differentiation of 9.7%, 7.2%, and 6.7% of patients was good (Grade I), moderate (Grade II), and poor (Grade III), respectively, and 75.8% of patients had no report on the status of tumor degree of differentiation in the pathology experiments.

The major sites of tumor were cardia, antrum, fundus, lesser curvature of the stomach, greater curvature of the stomach, body, and pylorus with 6.8%, 4.6%, 1.4%, 4.2%, 1.4%, 1.7%, and 0.4%, respectively. However, the anatomical site of the tumor had not been reported in 80% of patients.

The mean survival of patients was 44.56 months (38.34-50.78, 95% CI), and the median survival was 11 months (4.31-17.61, 95% CI). The 1-, 3-, and 5-year survival of patients in this study was 43%, 39%, and 36%, respectively. The results of the ranked logarithm test for comparison of survival rates of subgroups indicated that in terms of mean survival, male patients had a longer survival than women, though this difference was not statistically significant (p=0.19).

Regarding tumor morphology, the maximum mean survival was for the unspecified neoplasm (53.88 months), while the shortest survival belonged to invasive adenocarcinoma, and this difference was statistically significant (p=0.001).

The mean 5-year survival rate in patients with a good tumor degree of differentiation (G1) was 49.81 months, showing a higher mean survival rate compared to moderate degree (G2) 34.94 months and poor degree of differentiation (G3) 37.87 months, but this difference was not statistically significant (p=0.739).

Regarding the site of the tumor, the pylorus orifice with 68.18 months (42.03-94.33 months) had the maximum survival, followed by the fundus with 54.50 months (0.000-114.78 months), lesser curvature of the stomach with 54.40 months (27.18-81.61 months), greater curvature of the stomach with 52.50 months (0.000-112.78 months), cardia with 49.43 months (25.05-73.79 months), body with 8.75 months, and pylorus with 0 months had the maximum survival for patients with Gastric Cancer. However, log-rank statistic showed that the site of the tumor cannot be a predictor variable for survival of patients (p=0.084).

Unfortunately, in our country, there is no plan for screening patients with Gastric Cancer, and even some patients, despite having suspicious symptoms such as stomachache, weight loss, dysphagia, etc., remain undiagnosed for a long time. Most of them are diagnosed with definite Gastric Cancer in the advanced stages of the disease. Thus, the 5-year survival of patients with Gastric Cancer in Iran is low, and it remains a challenge.

Also, in this study, to assess the proportionality of Cox hazards, the Schoenfeld residuals method was used. Based on the results, the Cox proportionality hazards assumption was not rejected. Thus, Cox regression was used for the analysis (p=0.055, ch2=3.01). According to the results, male gender caused a 2.89-fold increase in the hazard of diminished survival rate (p=0.001). The increase in the tumor grade of patients has caused an increased hazard, such that grade II compared to I has added 61%, and grade III compared to I has added 37% to the hazard, though the increase in hazards in the disease grade was not statistically significant. However, in Orman's study, this variable was known as a prognostic factor. Although in Mogumi and Wisani studies, there was no significant difference in the survival of patients based on the degree of tumor differentiation. The possible reason for this discrepancy can be the quality and quantity of data recorded and the values that can be measured. Note the missing data in these studies (27, 19, 3).

Conclusion

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Age at the time of diagnosis, anatomical site of tumor, type of tumor histology, and stage of disease diagnosis were among the prognostic variables for the survival of patients in this study. It seems that the most important problems for increasing the survival of patients are late diagnosis, the progressivity of the disease, and the increasing number of diffuse cases, with this study also confirming these reasons. Eventually, the results of this study indicated that the survival of patients with Gastric Cancer in Sagheze City is higher compared to most previous studies, both in Iran and abroad. Nevertheless, attempts to increase this survival further and improve therapeutic measures and early diagnosis are essential.

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Conflict of interest

The authors declare that they have no conflict of interest.

Authors' contributions

SR and KHA contributed to the design, YV and SR performed the statistical analysis, and participated in most of the study steps. GHA and FSH prepared the manuscript. All authors have read and approved the content of the manuscript.

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