

# Survival Study over 5 Years of Digestive Cancers in Tlemcen Province during 2011-2017

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**Abstract:** In the world, digestive cancers represent a major public health problem by their frequency and severity. Digestive tract cancers are very common malignant tumors worldwide and are an important cause of cancer-related death. The objective of our study was to determinate the survival of digestive cancers in the province of Tlemcen over a period of 5 years. This is a prognostic historical-prospective study with an exhaustive collection data, which consists of studying the 5-year survival of digestive cancers in the province of Tlemcen, of all patients with digestive cancers whatever the stage, diagnosed between 2011 and 2012 and histologically confirmed in subjects residing in the province of Tlemcen at the moment of diagnosis. The subjects of our study were identified from the cancer registry of Tlemcen. In total, 408 cases of digestive cancers were diagnosed over 2 years in Tlemcen province. Most digestive cancers were characterized by a predominance of men except for cancer of the liver, gallbladder and bile ducts but whatever the sex, these cancers occur mainly in subjects whose age is greater than or equal to 45 years. Topographically, for both sexes combined, the colorectum followed by the stomach were the organs most affected by digestive cancers. Histopathologically, a predominance of adenocarcinoma has been noted. The 5-year global survival rate of all digestive cancers was 55.4%, depending on the localization; colorectal cancer, small bowel cancer, gallbladder and bile ducts cancer, stomach and esophagus cancers are cancers of intermediate prognosis whose survival in 5 years is between 40% and 80%. Liver cancer and pancreatic cancer remain poor prognosis cancers with 5-year survival rates of 23.08% and 33.3% respectively. The survival of digestive cancers must be improved by adequate care and surveillance of patients. The prevention of colorectal cancers which occupy the first place among the digestive cancers is based essentially on the knowledge of the risk factors and the screening allowing the improvement of the survival rate. The registry of cancer remains a fundamental tool of any cancer control program; it constitutes a starting source for the analysis of survival.

**Key words:** Digestive cancers, mortality, survival, prognosis, register, Tlemcen.

## 1. Introduction

Cancer has emerged as the leading cause of death in human populations, according to recent estimations [1]. In the world, digestive cancers represent a major public health problem by their frequency and severity. The responsibility of the environment in the development of certain cancers, especially those of the digestive system, is today a fact that seems well established [2].

Digestive tract cancers are very common malignant tumors worldwide and are an important cause of

cancer-related death [3].

In Algeria, digestive cancers represent a quarter of cancers in general [4]. Digestive cancers, especially colorectal cancers, have experienced a rapid increase since the early 2000 [5].

Also, the accelerated characters of the demographic and epidemiological transition in our country [5], rapid industrialization where food habits and sedentary lifestyle are constantly changing play an important role in the occurrence of digestive cancers [4]. In fact, diet is responsible for 30% to 50% of cases of colorectal cancer [6].

Cancer registers are now an essential device for cancer surveillance [7]. They are a fundamental tool of

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any cancer control program, it is a primary source for cancer control strategies; it can be a source of cohort studies and clinical trials, and perhaps most importantly, the starting point for analysis of survival [8].

Cancer registers are privileged tools for studying the epidemiological characteristics of digestive cancers and evaluating the political and health guidelines taken to improve their care [7].

In Algeria, few studies have studied the survival of cancers in general and digestive cancers in particular. Also, the epidemiological data on digestive cancers remain fragmentary, while these pathologies are more and more noted in our context.

The objective of our study was to determinate the survival of digestive cancers in the province of Tlemcen over a period of 5 years, also, to know the epidemiological and histopathological particularities of digestive cancers in Tlemcen.

## 2. Materials and Methods

This is a prognostic historic-prospective study, with exhaustive collection data which consist of studying the survival in 5 years of digestive cancers in the province of Tlemcen. All patients with digestive cancer were included in our study, whatever the stage, histologically confirmed and diagnosed between January 1, 2011 and December 31, 2012 in subjects residing in the province of Tlemcen at the time of diagnosis. Patients of study were identified from the cancer register of Tlemcen province which is a population register.

The diagnosis of digestive cancer was confirmed histologically and identified according to the international classification of diseases in Oncology in its third division (ICD-O3) under codes; all histological subtypes have been included [9].

The vital status of the subjects was determined for 5 years for each participant in the study from January 01, 2011 to December 31, 2017 (Fig. 1).

All primary malignant tumors of the digestive system were included: digestive tract, liver, pancreas,

gallbladder and bile ducts, peritoneum and retro-peritoneal tissues. Nine digestive tumor locations were selected, according to the international classification of digestive tumors ICD 10 [10].

The cancer registry of Tlemcen province was an essential and initial data source in our study. The data relating to the vital status of our patients were sought at the communal Popular Assemblies of the province of Tlemcen, Directorate of Planning and Spatial Planning of Tlemcen and Department of Legal Medicine at University Hospital Center of Tlemcen.

Ethical considerations consisted of confidentiality of data by reporting the results of the study anonymously; necessary precautions have been taken to ensure the confidentiality of the information sought at the various places in our study.

The data were entered and analyzed by statistical software SPSS version 17.

- Descriptive statistical analysis: description of the qualitative variables by calculating the percentages (%) and the quantitative variables by calculating the means, the 95% confidence interval, the standard deviation and the median.

- Bivariate statistical analysis: the statistical tests used are the Pearson Chi-square test to compare proportions and with the risk of first species  $\alpha$  fixed at 5%.

- Survival analysis: the evolution of survival as a function of time has been represented in a non-parametric method by the Kaplan Meier curve, differences between the survivals data were analyzed with the Log-rank test. The risk of first species  $\alpha$  was fixed at the threshold of 5% to judge the significance of the statistical tests under the bilateral hypothesis.

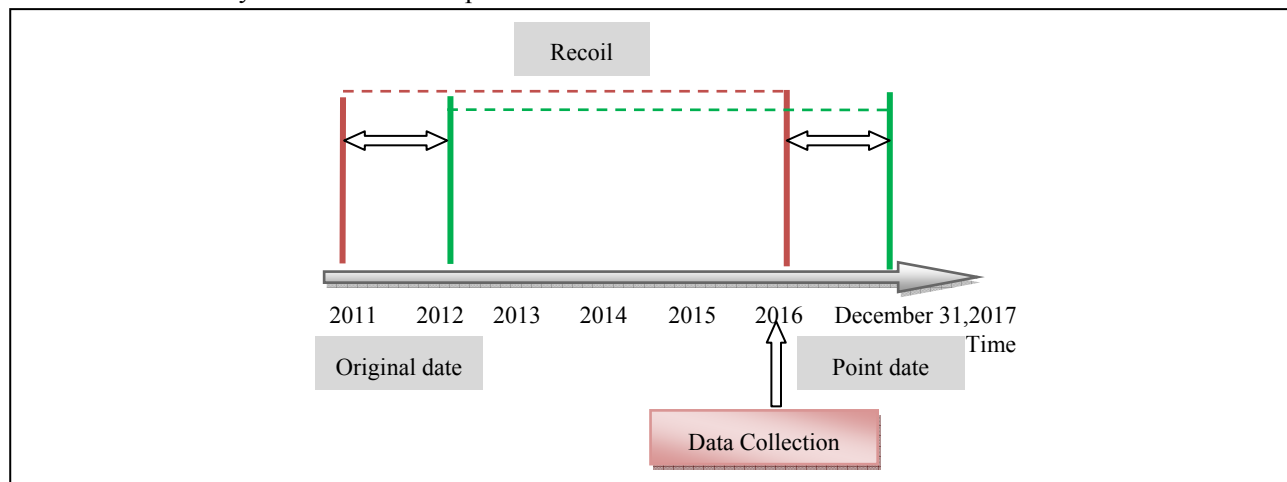
## 3. Results

### 3.1 Description of Patients Affected by Digestive Cancers in the Province of Tlemcen

#### 3.1.1 Number of Cases of Digestives Cancer

A total of 408 patients with digestive cancers were

registered during the years 2011 and 2012. The number of cases increased by 40% in 2012 compared to 2011 (Table 1).



**Fig. 1** Illustrative diagram of the study.

**Table 1** Descriptive characteristics of patients with digestive cancers in the province of Tlemcen; 2011-2012.

Variable	Categories	Number of cases (n = 408)	Percentage (%)
Gender			
	Female	170	41.7
	Male	238	58.3
Age of patients (years)			
	< 45	56	13.8
	45-55	96	23.5
	56-65	115	28.2
	≥ 65	141	34.5
Year of diagnosis			
	2011	170	41.7
	2012	238	58.3
Digestive cancers among all cancers			
	Digestive cancers (C15-C26)	408	19.5
	All Cancers (except C44)*	2,089	100

\* Except for skin cancer without melanoma (C44).

### 3.1.2 Sex

Digestive cancer is common in males, accounting for 58.3% of a total of 408 patients (Table 1). The sex ratio is 1.4.

### 3.1.3 Age

The average age of patients at diagnosis was 59.71 years  $\pm$  14.12 years with a minimum age of 4 months and a maximum of 91 years. And 86.2% of the patients were over 45 years of age (Table 1).

In children, three cases of digestive cancers of hepatic localization were recorded in children less than 16 years of age, two female cases aged 4 months and 4 years respectively and one male case aged 10 years.

### 3.1.4 Place of Residence

The distribution of patients by place of residence showed that all the municipalities of the province of Tlemcen were affected, but with varying proportions from one municipality to another. The municipality of Tlemcen was the most affected (41.7%); followed by the municipality of Maghnia (19.4%) and Remchi (8.1%). The rest of the municipalities represented almost 1/3 of the cases.

## 3.2 Epidemiological Aspects of Digestive Cancers in the Province of Tlemcen

### 3.2.1 The Place of Digestive Cancers among Cancers in the Province of Tlemcen

Digestive cancers represented 19.5% of cancers of a total of 2,089 cases of cancer recorded over a two-year period (Table 1); 24.1% in men and 15% in women.

### 3.2.2 Site of Digestive Cancers

Topographically, for both sexes combined, the colorectum followed by the stomach are the organs most affected by digestive cancers followed by gallbladder cancer and hepatic bile ducts. Then in order

of frequency: pancreas, esophagus and liver cancer. cancers (Table 2).

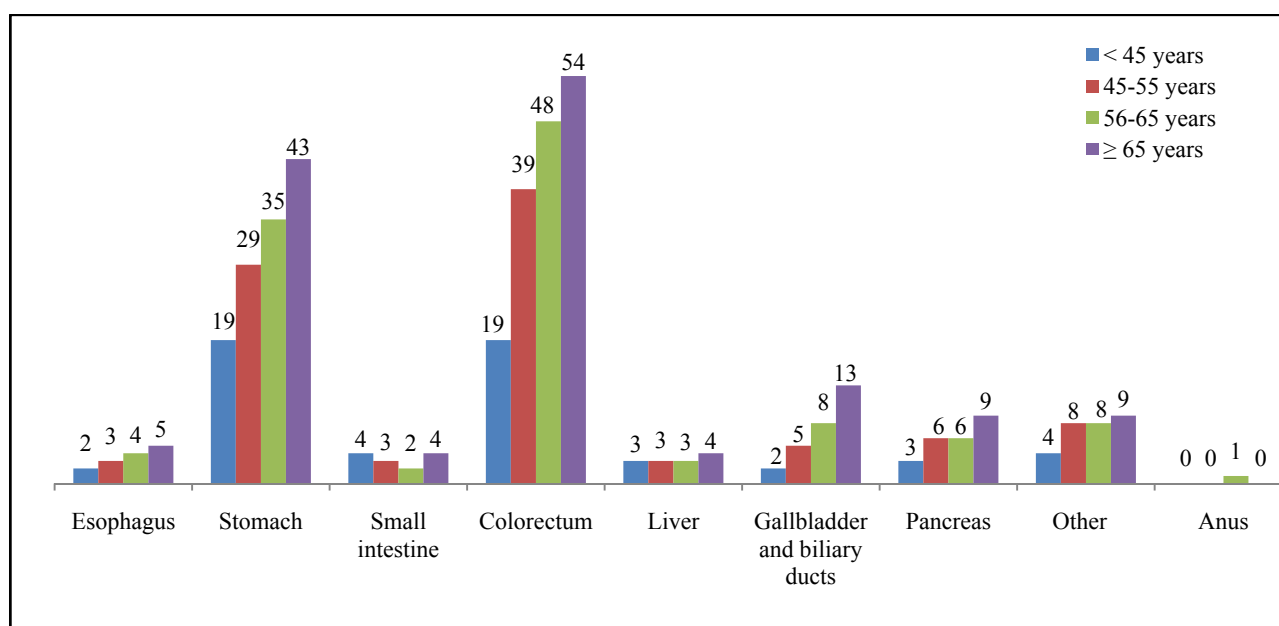
One case of anal cancer has been recorded. Other

ill-defined seat locations represented 7.1% of digestive

**Table 2** Distribution of digestive cancer cases by sex and localization in province of Tlemcen.

Localization of digestive cancer/topography ICD-O3	Gender				Total N	Total %	Sex ratio (M/F)
	Male		Female				
	N	%	N	%			
Esophagus (C15)	9	3.78	5	2.94	14	3.43	1.80
Stomach (C16)	75	31.51	51	30.00	126	30.88	1.47
Small intestine (C17)	11	4.62	2	1.17	13	3.18	5.50
Colorectal (C18-20)	94	39.49	66	38.82	160	39.21	1.42
Liver (C22)	6	2.52	7	4.11	13	3.18	0.85
Gallbladder and biliary ducts (C23-C24)	11	4.62	17	10.00	28	6.86	0.65
Pancreas (C25)	18	7.58	6	3.52	24	5.88	3.00
Other digestive tumors*	14	5.88	15	8.82	29	7.10	0.93
Anus (C21)	0	0.00	1	0.58	1	0.24	-
Total	238	58.33	170	41.7	408	100	1.4

\* The category "other digestive tumors": C26; C48; C762 and C763; includes malignant tumors of the digestive organs of other and ill-defined sites, malignant tumors of the peritoneum and retroperitoneum and malignant tumors of other and ill-defined sites of the abdomen and pelvis.



**Fig. 2** Distribution of digestive cancer cases according to location and age groups.

### 3.2.3 Digestive Cancers by Sex and Localization

The distribution of digestive cancer cases by sex and localization shows that a predominance of men has been noted for cancers of the esophagus, stomach, small intestine, colorectal and pancreas. Concerning cancers of the liver, gall bladder and hepatic bile ducts, a predominance of the female sex was recorded (Table

2).

### 3.2.4 Digestive Cancers by Age and Localization

The distribution of digestive cancer cases by age and location shows that the majority of digestive cancers have affected people over 45 years of age. The most affected age group is over 65 years of age (Fig. 2).

### 3.3 Histopathological Aspects of Digestive Cancers in

### the Province of Tlemcen

#### 3.3.1 Basis for the Diagnosis of Digestive Cancers

The pathology examination represented the essential diagnostic basis in 86% of the cases followed by the death certificate in 6.6% of the cases.

#### 3.3.2 Stage of Cancer at the Moment of Diagnosis

The stage of digestive cancers in the moment of diagnosis was determined in 214 patients, of which 39.25% of digestive cancers were diagnosed at a local stage and 28.50% at a locoregional stage. Almost of the cases (32.25%) were diagnosed at a stage of metastasis. Stage has not been determined in 194 patients (47.54% of cases) (Table 3).

#### 3.3.3 Histological Type of Digestive Cancers

The morphological aspect differs depending on the location of the digestive cancer. The most frequent morphological aspect for all digestive cancers was adenocarcinoma which represented 61.76% of cases (252 out of 408), carcinomas (without other indication) represented 6.61% (27 cases).

Squamous cell carcinoma was the most common in esophageal cancer, accounting for 78.6% of cases (11 of 14 cases).

#### 3.3.4 Primary Lymphomas of the Digestive Tract Cancer

Two point six nine percent (2.69%) of the digestive cancers were primary lymphomas of the digestive tract, located mainly in the stomach (seven cases) followed by the small intestine (two cases), the liver (one case) and other (one case).

### 3.4 Survival Study of Digestive Cancers in the Province of Tlemcen

The 5-year survival rate, all digestive cancers combined, was 55.4% (Fig. 3). The survival rate decreases with the years, going from 69.1% of the first year to 55.4 % of the fifth year (Table 4). Survival curves differ depending on the site of the digestive cancer (Fig. 4).

**Table 3** 5-year survival rate of digestive cancer cases in Province of Tlemcen during 2011-2017.

	Effective <i>n</i> = 408	Deceased <i>n</i> = 182	5-year survival rate	<i>p</i> *
<b>Gender</b>				
Male	239	115	51.89	<i>p</i> = 0.08 (NS)
Female	169	67	60.35	
<b>Age (years)</b>				
< 45	56	17	96.64	<i>p</i> = 0.052 (NS)
45-55	96	40	58.33	
56-65	115	60	47.82	
≥ 65	141	65	53.90	
<b>Cancer site</b>				
Esophagus ( <i>n</i> = 14)	14	07	50.00	<i>p</i> = 0.001
Stomach ( <i>n</i> = 126)	126	60	52.38	
Small intestine ( <i>n</i> = 13)	13	04	69.23	
Colorectum ( <i>n</i> = 160)	160	56	65.00	
Liver ( <i>n</i> = 13)	13	10	23.08	
Gallbladder and biliary tracts ( <i>n</i> = 28)	28	10	64.28	
Pancreas ( <i>n</i> = 24)	24	16	33.33	
Other digestive tumors ( <i>n</i> = 29)	29	19	34.48	
Anus ( <i>n</i> = 1)	01	00	100.00	
<b>Stage of cancer at moment of diagnosis** (<i>n</i> = 214)</b>				
Local	84	22	37.81	<i>p</i> < 0.001

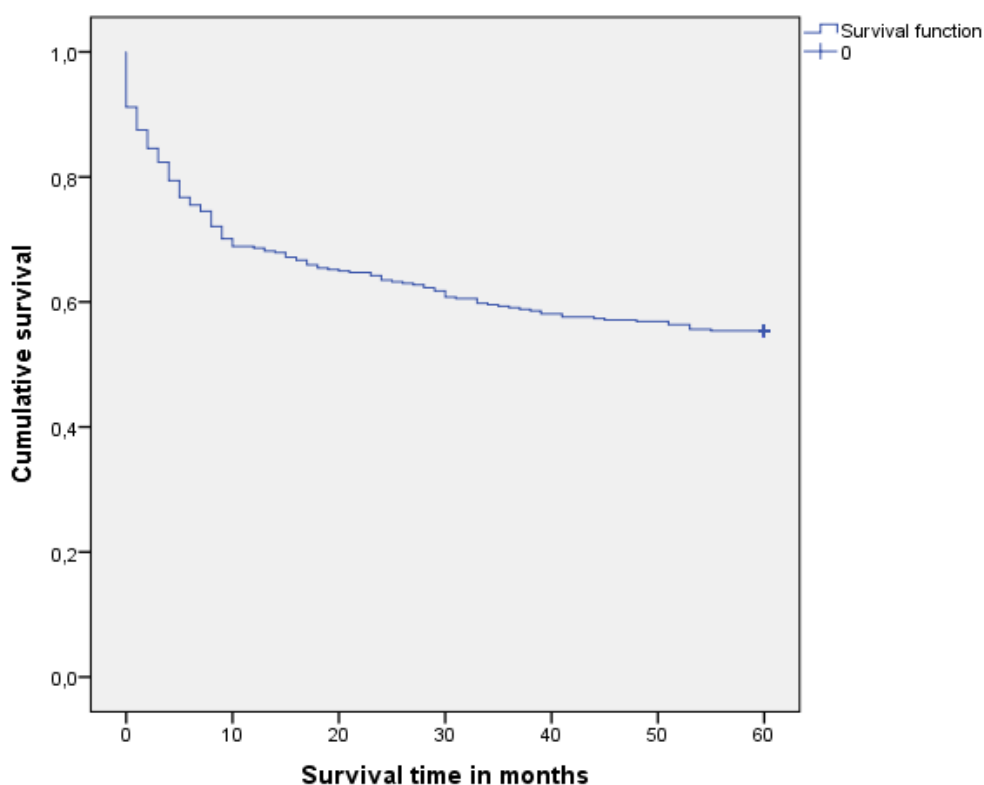
Locoregional	61	30	50.82
Metastasis	69	48	30.43

*p*: Degree of significance ( $\alpha$ : first species risk, confidence interval: 95%); NS: not significant.

\* Log rank test comparing survival curves; \*\*: undetermined stage was not included in statistical analyses.

**Table 4 Evolution of the global survival probability of digestive cancer cases according to the survival time in years.**

Survival time (year)	Global survival probability (%)
1	69.1
2	65.9
3	60.0
4	58.6
5	55.4



**Fig. 3 Curve of global survival of Kaplan-Meier for digestive cancer cases in Tlemcen province during 2011-2017.**

#### 3.4.1 Status of Patients at the Point Date According to Sex

At the point date, 63.18% of the deceased patients were male (115/182) and 36.82% were female (67/182) (Table 3).

#### 3.4.2 Status of Patients at the Point Date According to Age

At the point date, 90.65% of the deaths were of an age over 45 years. More than 1/3 of the deaths were of an age over 65 years (Table 3). In children, two among

three cases of liver cancer were deceased.

#### 3.4.3 Place of Death

Almost 80% of the deaths took place at home, the other subjects died at the health establishments of Tlemcen.

#### 3.4.4 Status of Patients at the Point Date According to Cancer Site

The 5-year survival rate for digestive cancers according to site is  $\leq 50\%$  for cancer of esophagus, pancreas, and liver. It is between 50% and 70% for colorectal cancer, stomach cancer, small intestine

cancer, gallbladder and bile duct cancer (Table 4).

3.4.5 Patient Follow-Up Time

The mean duration of follow-up was higher in survivors compared to death (60 months VS 11.3 months); with  $p < 0.0006$ . All survivors had the same

60-month follow-up period; vital status has been reported for all patients. No loss of sight was recorded (Table 5).

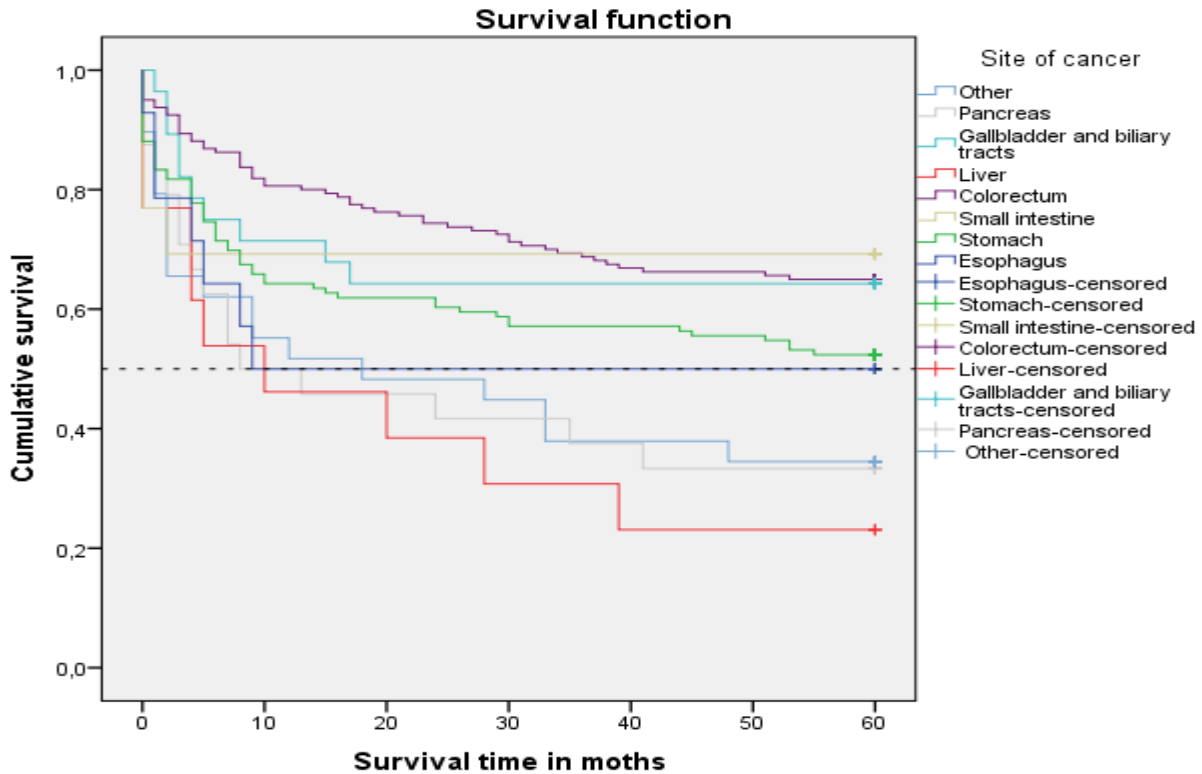


Fig. 4 Curve of global survival of Kaplan-Meier for digestive cancer cases by site in Tlemcen province during 2011-2017. Logrank: 26.23;  $p < 0.001$ .

Anus cancer: one case that survived.

Table 5 Distribution of digestive cancers by follow-up time and status at the point date in province of Tlemcen during 2011-2017.

Duration of follow-up (months)	All	Survivors	Deceased
Average	38.28	60	11.3
CI 95% (average)	(37.00-39.56)	-	(10.27-12.35)
Deviation type	25.98	-	14.06
Median	60	60	5.00
Minimum-maximum	0-60	60-60	0-55
Effective	408	226	182
CI (confidence interval)			

3.5 Global Survival Study in Five Years of Digestive Cancers in the Province of Tlemcen

3.5.1 Sex and Age

The difference in survival curves was not statistically significant between female and male and

between the different age groups (Table 7).

3.5.2 Site of Digestive Cancer

The difference in the survival curves was statistically significant between the different localizations of digestive cancer; in five years of follow-up, the probability of global survival was 23.1%

in patients who presented with liver cancer.

Median survival has been recorded in patients with esophageal cancer, small intestine; liver and pancreas was 9 months, 39 months, 20 months and 8 months respectively.

In patients with liver cancer, the risk of death was 1.82 times greater than that observed in patients with other locations of digestive cancer (Table 7).

### 3.5.3 Stage of Digestive Cancer at Diagnosis

The difference in the survival curves was

statistically significant between the different stages of the tumor at the moment of diagnosis. The probability of global survival decreased with the stage of digestive cancer at the time of diagnosis.

The median survival in patients with digestive cancer diagnosed at the metastasis stage was 15 months. The risk of death in patients with digestive cancer diagnosed at the metastasis stage was multiplied by 3.7 compared to patients with digestive cancer diagnosed at a local stage (Table 7).

**Table 6 Results of studies on digestive cancers by sex and age in different countries.**

Country	Authors	Study period	Effectives	Sex ratio (M/F)	Average (years)	Age (min-max)
Algeria	S. Benbekhti	2011-2017	408	1.4	59.7 ± 14.1	0.3-91
Morocco [11]	R. Benelkhaiat	1997-2008	3,838	1.5	58.1	3-100
France [12]	J. Faivre	2000	59,214	1.52	/	/
France [13]	M. Brun	1999-2008	2,208	1.38	69 ± 12.8	/
France [14]	A.-M. Bouvier	1988-1997	48,928	1.34	/	/
Brazzaville [15]	J. F. Peko	1992-2001	375	1.4	39-49	/
Niger [16]	Mamoudou	1992-2009	594	1.62	47.01 ± 15.58	1-85
Togo [17]	A. Bagny	2005-2012	250	2.33	52.8 ± 15.71	19-90
Ivory Coast [18]	A. B. Effi	1984-2007	1,620	2.4	48.65	2-107
Ivory Coast [19]	H. Y. Kissi Anzouan	2012-2015	221	2.7	52.2 ± 14.4	21-86
Burundi [20]	P. Kadende	1988-1989	145	3.2	52.80	/
Burkina Faso [21]	S. Ouedraogo	2013-2017	352	0.99	43.3 ± 18.5	/

**Table 7 Global survival analyses in five years of digestive cancer in Tlemcen province during 2011-2017.**

Variables	Effective	Rate of mortality	Average survival (months)	Median (months)	HR* CI at 95%	p Logrank
<b>Sex</b>						
Males	238	48.73	36.63 (33.34-39.93)	-	0.74 (0.55-1.00)	0.052 (NS)
Females	170	38.82	40.97 (37.17-44.76)	-		
<b>Age groups (years)</b>						
< 45	56	30.4	45.00 (38.75-51.25)	-	1	0.106 (NS)
45-55	96	41.7	38.88 (33.63-44.14)	-	0.59 (0.34-1.01)	
56-65	115	52.2	35.87 (31.27-40.48)	39.00	0.89 (0.60-1.32)	
≥65	141	44.6	37.63 (33.32-40.94)	-	1.13 (0.79-1.60)	
<b>Site of cancer</b>						
Others (anus included)	30	63.3	38.44 (35.94-40.94)	-	1	< 0.001
Esophagus	14	50.0	32.00 (17.28-46.71)	09.00	1.08 (0.55-2.13)	
Stomach	126	47.6	36.29 (31.64-40.93)	-	0.95 (0.70-1.29)	
Small intestine	13	30.8	41.69 (26.76-56.62)	39.00	0.60 (0.25-1.45)	
Colorectum	160	35.0	44.58 (41.05-48.11)	-	0.60 (0.44-0.82)	
Liver	13	76.9	24.30 (11.81-36.80)	20.00	1.82 (1.02-3.24)	
Gallbladder and bile ducts	28	35.7	40.71 (31.05-50.37)	-	1.31 (0.61-2.82)	
Pancreas	24	66.7	26.37 (16.05-36.69)	08.00	1.56 (0.97-2.51)	
<b>Stage at diagnosis**</b>						



Local	84	26.19	47.06 (42.24-51.87)	-	1	
Locoregional	61	49.18	39.39 (33.43-45.35)	-	2.03 (1.17-3.53)	< 0.001
Metastasis	69	69.56	26.71 (20.80-32.61)	15.00	3.70 (2.23-6.15)	

HR\*: Hazard ratio; CI: confidence interval.

\*\* : Undetermined stage was not included in statistical analyses (missing data).

## 4. Discussion

### 4.1 Place of Digestive Cancers among Cancers

Cancers of the digestive system are the most common among all cancers, their frequency is high and remains underestimated because they are not always diagnosed [11].

Digestive cancers represented 19.5% of cancers: 24.1% in men and 15% in women, this result is similar to the results found in the national and international literature.

According to the cancer registry of Algiers [22], digestive cancers represented 24.7% of cancers in men and 17.5% in women. As well as the cancer registry of Oran [23], it demonstrated that digestive cancers represented 16.7% of all cancers in 2014: 20.9% in men and 13.7% in women.

Also, a study carried out over a period of 21 years in Oran (1996-2016) [24] showed a frequency of 19% of digestive cancers among other localizations in men and 13% in women.

In Chlef (Algeria) [25], the place of digestive cancers among cancers in general is much more important; over a decade, digestive cancers accounted for 32.48% of cases in men after lung cancer and 24.82% in women after genital cancers.

In Morocco [11], a study was carried out over a 12-year period from January 1, 1997 to December 31, 2008, and was able to identify 3,838 cases of digestive cancers, or 27.4% of all cancers, occupying the first rank.

In another study carried out in Morocco [26], the digestive system represents the most frequent location in a series of 5,532 cases of cancer diagnosed in the Fes-Boulemane region, or 20.25% of cases.

The estimate of the incidence of digestive cancers for the whole of France in 2000 [12] was made from

data from 11 French departments and showed that digestive cancers represented 22% of cancers in humans and 20% in woman out of a total of 278,000 cancer cases.

According to other estimates in France [14] in 2005 from incidence data from 12 departments covered by a cancer register, belonging to the Francim network (French cancer registries network) which represents around 15% of the national territory, the number of new cases of cancers of the digestive tract (esophagus, stomach, colon and rectum) was 28,051 in men and 20,877 in women. They accounted for 35.7% of all cancers in men and 15.3% of cases in women.

In Burundi [20], digestive cancers rank first among all cancers (37%).

In Mauritania [27], a study is based on all the data from the cancer registry of National Hospital Center of Nouakchott over 10 years of registration (2000-2009) which has shown that digestive cancers are common among cancers.

### 4.2 Epidemiological Characteristics of the Population Studied

#### 4.2.1 Sex

In our study as shown by several European and African studies, men are the most affected compared to women. Digestive cancers, in all localizations, are common in men except for cancer of the liver, gallbladder and bile ducts, which were common in women.

According to the Cancer Registry of Oran (1995-2006) [28], the sex ratio for digestive cancers (C15-C26) was 1.1.

A study carried out in Chlef (Algeria) [25] over a period of 10 years (1997-2006) on 388 cases of digestive cancers has shown that digestive cancers are

more common in men than in women, while cancer of the gallbladder biliary is more often encountered in the female sex.

The male predominance of digestive cancers, any localization has also been noted in several studies (Table 6) notably in Morocco [11] and in France [12-14] as well as in the different countries of Africa [15, 16, 18-20].

Except that in Burkina Faso [21], a slight predominance of women was found with a sex ratio of 0.99.

Stomach and esophageal cancers are much more common in men. These differences in gender distribution are often due to differences in exposure to triggers rather than variations in predisposition. For other types of tumors, including colorectal and pancreatic cancers, there are few differences in the distribution by sex [29].

#### 4.2.2 Age

Cancer is a disease that mainly affects the elderly. The number of people affected increases significantly with age, becoming more than eight times greater after age 75 than before age 35 [30].

Our study has shown that digestive cancer has affected all ages, but the majority of patients has an age greater than or equal to 45 years, or a percentage of 86.2%. The average age of our study population was  $59.7 \pm 14.1$  years with extremes of 4 months and 91 years.

Most of the studies found an average age greater than 40 years (Table 6); our result is similar to that found in Morocco [11] whose average age at the time of diagnosis was 58.1 years in 3,838 cases of digestive cancer.

In France [13], the majority of patients were diagnosed after the age of 65 (65%).

#### 4.3 Localization of Digestive Cancer by Frequency

Colorectal and gastric cancers represented the most frequent digestive cancers, accounting for 39.21% and 30.88% respectively of all digestive cancers.

Our study has shown that digestive cancers in the province of Tlemcen can be classified according to frequency in three categories:

- Frequency greater than or equal to 30%: frequent digestive cancers (colorectum and stomach cancers).
- Frequency between 5% and 30%: digestive cancers of medium frequency (pancreas, gallbladder and biliary tract).
- Frequency less than or equal to 5: rare digestive cancers (esophagus, small ball intestine, liver and anus).

Variable incidences of digestive cancers are progressing, mainly due to the increase in cases of colorectal cancer [31].

In the case of digestive cancers, in the country of Algeria, three localizations seem to be relatively frequent: colorectal, stomach, gallbladder and biliary ducts [32].

In Tunisia, colorectal cancer occupies the first rank of digestive cancers; there has been an increase in the incidence in recent years [33].

In Burkina Faso, colorectal and gastric cancers were the most frequent and accounted together for 53.2% of digestive cancers [21].

In France [13], the most frequently diagnosed cancer was colorectal cancer (50%), followed by cancer of the esophagus (12%) and stomach (12%).

France, Denmark, Ireland, Norway, Italy and the Netherlands have the highest rates of colorectal cancers for both sexes [14].

On the contrary, colorectal cancer was rare in South America, Asia (except in Japan where the incidence is now the same as in western countries) and especially in Africa [14].

In some studies, liver cancer has been the leading digestive cancer, 66.4% in Togo [17] and 40.2% in Brazzaville [15]. In Burundi [20], it is in second position (37.90%) after gastric cancer.

Studies in African countries in Burundi [20] and Niger [16] have shown that stomach cancer is the most common cancer among digestive cancers.

#### 4.4 Histological Characteristics Specific to Digestive Cancer Pathology

##### 4.4.1 Basics of Digestive Cancer Diagnosis

The anatomical pathology examination represented the essential diagnostic basis in 86% of the cases followed by the death certificate in 6.6% of the cases.

The high rate of histological evidence of more than 72% in the diagnosis of cancer is a parameter of validity of the results because the laboratory of the university hospital center of Tlemcen resumed its activity in recent years but also the private laboratories more and more in the city. The death certificate could, if it had to comply with the regulations in force and be generalized to all the civil status services responsible for registering deaths, constitute a precious and useful source for the register [8].

Analysis of data from the Tlemcen cancer registry [34] during the 2011-2016 period in view of the International Agency for Research on Cancer (IARC) quality criteria showed a microscopic verification rate (96%), death certificate reports (2%), attributing to the register an appreciable quality, better than that of previous editions.

The frequency of the bases of diagnosis of cancers in general in Oran over a period of 10 years (1995-2006) [28] by the histology of primary tumor was 81.8% and by the death certificate was 0.4%.

According to the cancer registry of Niger [16] the anatomo-pathological examinations had allowed the diagnosis of 51.7% of cancers of the digestive tract.

##### 4.4.2 Histological Types of Digestive Cancers

In our study, the predominant histological types were carcinomas, essentially adenocarcinoma. The most frequent morphological aspect for all digestive cancers is adenocarcinoma [22].

In Niger, the predominant histological types were carcinomas totaling 43% of the histological types (adenocarcinomas: 180 cases, carcinomas (without other indication): 81 cases) [16].

In Togo, a biopsy with anatomo-pathological

examination was carried out in 24.4% of the cases with regard to cancers of the digestive tract and found as the histological type predominantly adenocarcinomas in 70.5% of the cases [17].

##### 4.4.3 Primary Lymphomas of the Digestive Tract Cancer

Primary lymphomas of the digestive tract represented 2.69% among the digestive cancers in our study. The most common locations were the stomach followed by the small intestine and liver.

Primary lymphomas in the digestive tract are non-Hodgkin's lymphomas (NHL) [35]. They are rare, corresponding to 1% of gastrointestinal tumors [36].

It is a rare pathology as lymphomas represent only 3% of malignant tumors of the stomach, less than 1% of those of the colon and rectum and less than 18% of malignant tumors of the small intestine cancer which are same very rare [37].

The stomach is the most common site, followed by the small intestine and colon [38]. Primary hepatic lymphomas remain rare, constituting less than 0.1% of all non-Hodgkin's lymphomas [39].

##### 4.4.4 Stage of Digestive Cancer at Moment of Diagnostic

The stage is difficult data to collect in routine, because it requires, in the majority of the cases, to search this information in the medical file of the patients. Furthermore, the information available is not always consistent depending on the source of information (classification error, clinical stage versus anatomopathological stage) [40].

Very few registers in France, as at the international level, provide data by stage of cancer for survival analyses. It is that from 2010, the recording of the stadium was gradually put in place in the French registers allowing in the future, the analysis of the survival data by stadium [40].

American data from the Surveillance Epidemiology and End Results program (SEER), which provides cancer survival data by stage in 5 and 10 years, most often classifies the stages of cancer according to three

levels of evolution: localized, regional (lymph node invasion) and at a distance (metastases at a distance from the location), and an undetermined stage (insufficient information in the database to determine the stage). The advantage of this classification is that it is not sensitive to updates to the TNM Classification of Malignant Tumors (tumor: T, nodes: N, and metastases: M) [40].

#### 4.5 Survival Analysis of Digestive Cancer

##### 4.5.1 Mortality by Digestive Cancer

Digestive cancers are very common malignant tumors worldwide and are a major cause of cancer-related death [3]. In 2018, the crude death rate from digestive cancers was 47.1% and the age-standardized death rate 17.2% in the world [41]; In Algeria, the number of deaths in 2018 from digestive cancers was 7,528, crude death rate of 17.9% and an age-standardized death rate of 18.9 [42].

In North Africa, Algeria is the third country that has recorded a high mortality rate from digestive cancers after Egypt and Libya. Among the Maghreb countries, Algeria precedes Tunisia and Morocco [41]. In Tlemcen, the rate of mortality, with all digestive cancers combined, was 44.6%.

##### 4.5.2 Survival Analysis of Digestive Cancer

The 5-year survival rate, with all digestive cancers combined, was 55.4%, the 5-year survival rates vary depending on the site of cancer.

###### (a) Survival by Sex and Age

In our study, survival of digestive cancers does not differ by sex or age. Generally, cancer survival is better in women than in men [43] and age is also an important factor in the prognosis for survival [30].

The effect of age is even more marked when mortality is considered, since survival rate is often poorer in older patients due to later diagnosis and suboptimal treatments. In the area of cancer, the health system is far from addressing only the elderly [30]. It is important to remember that even if the risk of cancer increases with age, its impact is already very

significant at the middle ages of life [30]. When diagnosed with liver or pancreatic cancer, the prognosis is poor for both men and women [29].

In Ivory Coast, digestive cancers are very common in young people; they have a poor prognosis [18].

###### (b) Survival by Localization of Digestive Cancer

The 5-year survival rate, with all digestive cancers combined, was 55.4%, the 5-year survival rates vary from 33.3% to 100% depending on the localization.

A typology of cancers in three main classes can be proposed depending on the prognosis:

- Cancers with a good prognosis whose 5-year survival rate is greater than or equal to 80%: only anal cancer has a 5-year survival rate of 100%;
- Intermediate prognosis cancers whose survival rate in 5 years is between 40% and 80%: small intestine, colon-rectum, gallbladder and biliary ducts, stomach and esophagus;
- Cancers with a poor prognosis whose survival rate in 5 years is less than 40%: pancreas and liver and others of ill-defined site.

In France, the prognosis for cancers of the digestive tract has improved over time [44]. In Metropolitan France, colorectal cancers had a good prognosis (60%-79% in 5 years). Bad prognosis cancers included pancreatic, liver, stomach, esophageal and biliary tract cancers. Liver, pancreatic cancers had a poor prognosis (33% survival in 5 years) [45].

In Geneva, according to the Geneva register of tumors (2007-2010) [46], in men we observe survival rates in 5 years of 74% for rectal cancer; unfortunately for other digestive tumors, the prognosis in 5 years is not as good, in particular cancers of the stomach (38% and 22%, respectively in men and women), of the liver (15%), esophagus (15%) in humans. For colon cancer, the 5-year survival rate is 64% in men and 58% in women.

In Africa, the development of digestive endoscopy techniques has made it possible for very early diagnosis of many cases of digestive cancer [47, 48]. In Africa, in general, digestive cancers are misdiagnosed, as is the

case with the stomach [16].

In Ivory Coast, digestive cancers are very common in young people, they have a poor prognosis. Environmental and food factors are responsible for this. The prognosis is always grim despite the modern means of diagnosis. The extent of the cancer pathology in the Ivory Coast, in particular digestive cancers, should prompt the authorities to take preventive measures [18].

In Niger, despite the relatively frequent endoscopic examinations, digestive cancers are however diagnosed late, because most patients consult at a time when the symptoms are obvious and worrying, thus worsening the prognosis [49, 50].

#### (c) Survival by Stage of Digestive Cancer

The survival rate was lower when it came to the presence of distant metastases. The liver was the most common metastasis for digestive cancers.

The survival rate is linked to the localization of the cancer and its stage at the time of diagnosis. Thus, there is not one, but cancers with different prognoses. Certain increasingly numerous cancers are cured; some dark conservative non-prognostic; others that are long-term in, such as chronic diseases [40].

In our study, the liver was the most common metastasis. Liver metastases are the most common malignant liver tumors. In almost two thirds of the cases, they come from digestive cancers with colorectal cancer in the first rank [51].

## 5. Conclusion

Digestive cancers are frequent in the province of Tlemcen, they occupy the first localization group in men and the second in women after gynecological cancers.

The results obtained give a clear idea of the epidemiology and survival of digestive cancers in the province of Tlemcen, which remain frequent and occupy an important place among cancers. Most digestive cancers were characterized by a predominance of the male sex, except for cancer of the

liver, gallbladder and bile ducts but whatever the sex, these cancers occur mainly in subjects whose age is greater than 45 years.

Topographically, for both sexes combined, the colorectum followed by the stomach were the organs most affected by digestive cancers; cancer of gallbladder and bile ducts are also frequent in Tlemcen. Histopathologically, a predominance of adenocarcinoma has been noted.

The 5-year survival rate with all digestive cancers combined was 55.4%, the 5-year survival rates varied depending on the localization; small bowel cancer, colorectal cancer, gallbladder and biliary ducts cancer, stomach and Esophagus cancers are cancers of intermediate prognosis whose survival in 5 years is between 40% and 80%. Liver cancer, pancreatic cancer and other cancers of ill-defined site remain poor prognosis cancers with 5-year survival rates 23.08%, 33.3% and 36.7% respectively.

The survival of digestive cancers must be improved by adequate care and surveillance of patients. The prevention of colorectal cancers which occupy the first place among the digestive cancers is based essentially on the knowledge of the risk factors and the screening allowing the improvement of the survival rate. Early diagnosis through organized screening is the most effective way to reduce mortality from colorectal cancer.

The cancer registry remains a fundamental tool of any cancer control program, it constitutes a starting source for the analysis of survival but the recording of deaths in the civil status services in an exhaustive, standardized and reliable manner through the establishment of the death certificate is obligatory.

## Conflict of Interest

No conflict of interest.

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