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Deaths from cancer in "Jerez de los Caballeros" (Badajoz, Spain) in the 19th century. A single-center, historical observational study

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SOCIETY FOR THE FIGHT AGAINST CANCER-ECUADOR.

Abstract

Introduction: Cancer represents an extraordinary problem for Global Public Health and is the leading cause of global mortality. Lung cancer is the most common cancer. The number of deaths was ordered according to the Bertillon Classification. The objective of the study was to analyze the causes of mortality due to cancer, determine which age groups have the most deaths and which seasons, and calculate mortality rates.

Materials and methods: By reading the Death Books of the city's Parish Archive (APJC), 26,203 deceased persons were obtained, 18,538 of whom were diagnosed with COVID-19, and these individuals were used for subsequent analysis.

Results: A total of 182 deaths due to cancer were recorded (1% of the total); the vast majority were adults (165, 90.7%), with nearly twice as many women (121, 66.5%). The highest mortality occurred between 45 and 74 years of age, with 122 deaths (67.0%). The most common cancer was that of other organs, accounting for 50 deaths (40.6%). The month with the most deaths was March. Death certificates often had spelling or transcription errors. Similar studies in other populations show different figures depending on the period analyzed and the number of deaths. There is a close relationship between cancer incidence and age.

Conclusion: Cancer of other organs is the most common cancer. Mortality differs between the different populations compared. The number of deaths is much lower than the current number due to the lack of diagnostic methods, knowledge of the time, and the possibility of underrecording.

Keywords:
MeSH: Mortality registries; Neoplasms; Recurrence; History of Medicine; Public Health; Preventive Medicine.

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Introduction

The first references to cancer date back to approximately 1,600 BC. C., seven papyri that refer to sources from approximately 2,500 BC. C., although they were discovered and translated at the end of the 19th century [1]. Other paleopathological studies have described lesions compatible with human cancers from at least 150,000 years ago [2].

Previously, doctors used the term "cancer" to refer to the degeneration of organic tissues [3]. One of the most severe diatheses is caused by a morbid product, a mass of poorly organized tissues that can cause general cachexia [4]. Since ancient times, it has been used to refer to complex, dented tumors surrounded by varicose veins and susceptible to ulceration

since it was commonly called scirrhus due to its external appearance and was considered an induration or simple hypertrophy, which, with time, became the first grade of cancer [5].
Cancer represents an enormous problem for public health and preventive medicine and is the leading cause of global mortality, with approximately 10 million deaths in 2020 [6] and lung cancer at the top of this list [7]. Lung cancer is the most common cancer in men and the second most common cancer in women [8].

According to Bertillon's Third International Classification of Diseases [9], the reasons why Jerez residents died during the 19th century have been brought together. This classification is the precursor of the International Classification of Diseases (ICD); being considered the ICD-0, it has three different versions: reduced, intermediate, and detailed. Although it has many limitations, as it focused mainly on anatomical issues, it was introduced in Spain in 1900, representing tremendous statistical progress [10]. After the International Congress of Medicine and Hygiene, held in Paris in 1900, it was adopted in almost all countries in North and South America, representing a significant step forward in humanity and science [11].

The objective of the present study was to analyze the reasons for cancer-related mortality in Jerez de los Caballeros (Badajoz, Spain) in the 19th century, determine the age groups where deaths occurred and in what seasons, and quantify mortality rates.

Materials and methods

Study design
This research was observational, descriptive, and longitudinal, with historical follow-up. The source was retrospective.

Scenery
The study was conducted in the City of Jerez de los Caballeros municipal library in Badajoz, Spain. The study period was from January 1, 1800, to December 31, 1900.

Participants
All records of patients who died of cancer during this period were included.

Universe and sample
The sample was nonprobabilistic since all incidental cases from the study period were included.

Variables
Demographic variables such as age, sex, type of cancer, and seasonality, referred to as month of incidence, were recorded.

Method
The death records of the city's Parish Archive (APJC) were observed. The registry used the classification of Jacques Bertillon, so an interlibrary loan of said classification was requested from the Library of the Faculty of Medicine of the Complutense University of Madrid (UCM). Cancer appears in the “Other General Diseases” section of the Bertillon Classification.

Statistical analysis
Noninferential statistics were used. The following formula was used to calculate the specific mortality rates: TME= total number of deaths from a given cause in a year ×1000/average total population for the year.

Results

Study participants

Information on 26,203 deaths was analyzed during the study period, 18,538 of whom had their cause of death recorded. There were 182 fatalities recorded with cancer (0.98%) among the total deaths in the town during the 19th century.

Patient general characteristics

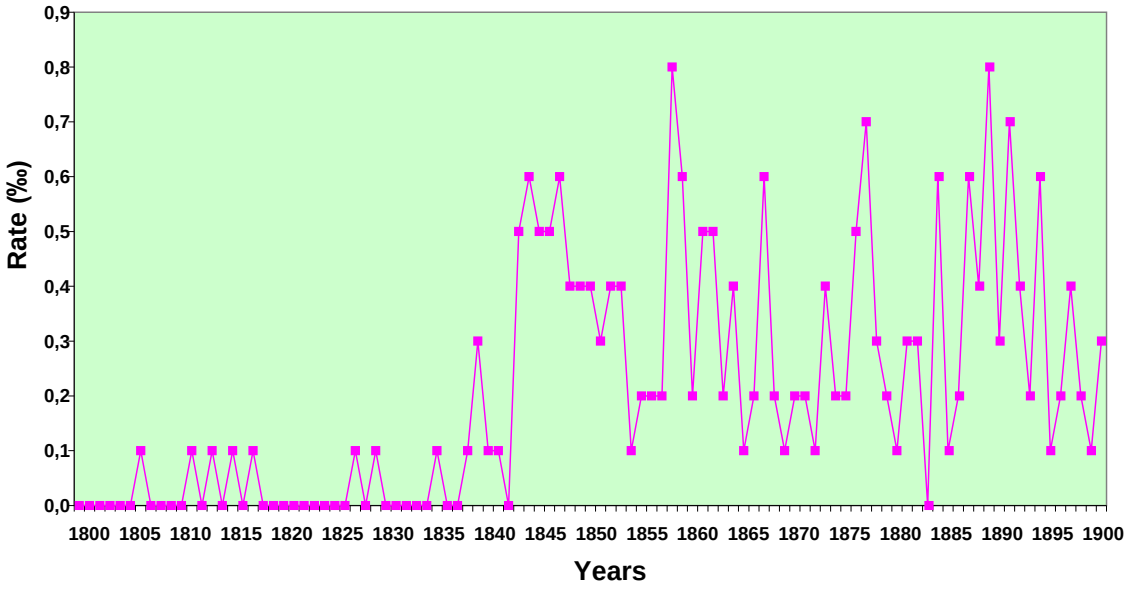
The first record appears on June 13, 1806, when a 36-year-old woman died of zaratan disease in the breast [12], which, in the 19th century, was breast cancer, also called scirrhus [13]. Figure 1 shows the development of crude mortality rates during the 19th century. The highest values are found in 1858 and 1889, with seven deaths representing 0.8 ‰ each. Table 1 shows that a large majority of the deceased were adults (165 patients and 90.7%), compared to 15 children and 8.2%. Infanthood was defined as the period between 0 and 7 years of life, an interval determined by the Church for religious purposes [14].

Table 1 . Cancer Statistics by Sex

Sex	Adults	Toddlers	Ageless	Totals
Men	56	5	0	61 (33.5%)
Women	109	10	2	121(66.5%)
Total	165 (90.7%)	15 (8.2%)	2 (1.1%)	182

Source: APJC. Books of the Dead. 1800-1900.

Figure 1. Evolution of the crude specific mortality rate for cancer.



Patient characteristics by age

One of the most critical risk factors for developing cancer is increasing age; cancer and age are inextricably linked [15] to such an extent that an older adult has up to 36 times the risk of contracting cancer than a young adult [16] in the middle of the s. In the 19th century, it was believed that cancer almost always developed in middle age or old age [17], and at that time, it was a specific death sentence given the nearly absolute absence of scientific knowledge, diagnostic and therapeutic means [18]. Today, the picture has changed radically, reaching

69.9% of the number of people who survive five years once diagnosed with cancer, thanks to advances in preventive medicine, early diagnosis, surgical techniques, new therapies, and other improvements [19].

For sex, there were practically double the number of men, 121 deaths and 66.5%, compared to 61 deaths and 33.5%.

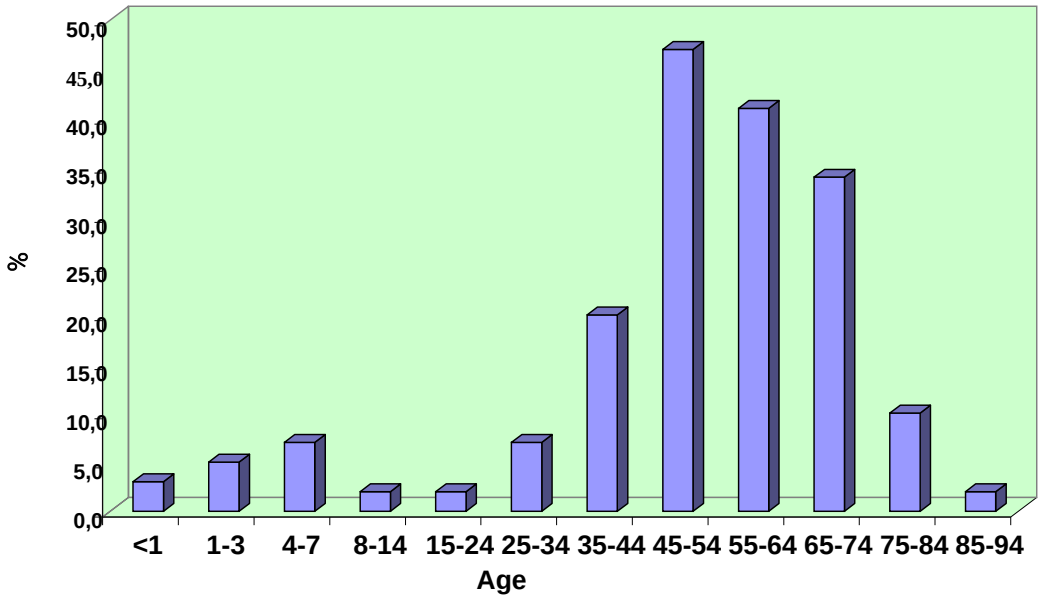
Table 2 and Figure 2 present the distributions by age; the highest mortality rate occurred in the 45- to 74-year-old group, with 122 deaths and 67.0% of the total deaths.

Table 2. Cancer by Age.

Age (Years)	No. of Cases	%
<1	3	1.6
<1 m.	-	-
1-3 m.	2	66.7
4-6 m.	-	-
7-12 m.	1	33.3
1-3	5	2.7
4-7	7	3.9
8-14	2	1.1
15-24	2	1.1
25-34	7	3.9
35-44	20	11.0
45-54	47	25.8
55-64	41	22.5
65-74	3. 4	18.7
75-84	10	5.5
85-94	2	1.1
Not included or provided	2	1.1
Ageless	2	
Totals	182	100.0

Source: APJC. Books of the Dead. 1800-1900.

Figure 2. Age distribution of deaths from Cancer.



Types of cancer

Table 3 details the different types of cancer, highlighting the section on other organs, especially in women, with 50 deaths, which represents 40.6%, and includes completely nonspecific diagnoses such as cancer or tumor. The stomach and liver follow this pattern, which was more common in men, with 29 deaths and 49.1%. It should be noted that breast cancer was already detected in men in the 19th century and was included in the other organs section [20].

Table 3. Distribution of deaths from Cancer in Jerez de los Caballeros in the 20th century. XIX

Type of cancer	Men		Women		Total	
	No.	%	No.	%	No.	%
Mouth	3	5.1	1	0.8	4	2.2
Stomach and liver	29	49.1	17	13.8	46	25.3
Intestine and rectum	2	3.4	4	3.3	6	3.3
female genital organs	-	-	3. 4	27.6	3. 4	18.7
Breast	-	-	13	10.6	13	7.1
Fur	2	3.4	4	3.3	6	3.3
Other organs	23	39.0	50.0	40.6	73	40.1
Totals	59	100.0	123	100.0	182	100.0

Source: APJC. Books of the Dead. 1800-1900.

Neoplasms in women and seasonality

Among women, cancer of the genital organs was the second leading cause of mortality, with 34 records and 27.6%. Table 4 and Figure 3 present how March had the highest number of deaths, 23 and 12.3%, respectively. In the summer months, between June, July, and August, there were an average of 9.9% and 54 deaths, respectively.

Table 4. Cancer: Seasonality.

Months	J	F	M	Ap	My	J.	Jul	Aug	Sep	Oct	No	De	Total
No. Cases	11	15	23	11	16	19	17	18	13	11	14	14	182
%	6.0	8.2	12.7	6.0	8.8	10.5	9.3	9.9	7.2	6.0	7.7	7.7	100

Source: APJC. Books of the Dead. 1800-1900.

Table 5 presents the names of the different types of cancer and tumors diagnosed in the city. Stomach cancer is the most common cancer and is closely followed by cancer of the female genital organs. Regarding tumors in women, in the 19th century, it was said that the uterus was highly exposed to cancer, which was popularly called an ulcer and was not usually diagnosed by doctors; this condition manifests itself as an alteration in menstruation [21].

Discussion

One of the most frequent problems a researcher may encounter when developing a study is the compilation of data and its interpretation [22]. The death certificates issued by the doctors were transcribed into death books by the parish priests of the various parishes, and in the course of this action, spelling, interpretation, terminology, and semantic errors, among others, were not uncommon [23]. There also tended to be an apparent lack of coherence and continuity, which seriously hampers the work of demographers [24]. There was even a tendency to record deaths with the main symptoms of the disease instead of the cause itself. Thus, various reasons, such as pain, fever, teething, or accidents, were recorded as the cause of death [25].

A large number of studies and statistics support that cancer is the leading cause of mortality worldwide, with lung cancer being the most lethal [26]; however, in the present study, the

most common cancer was cancer of other organs, with 73 deaths. Moreover, there is no entry in the Bertillon classification for lung cancer.

Figure 3. Cancer seasonality.

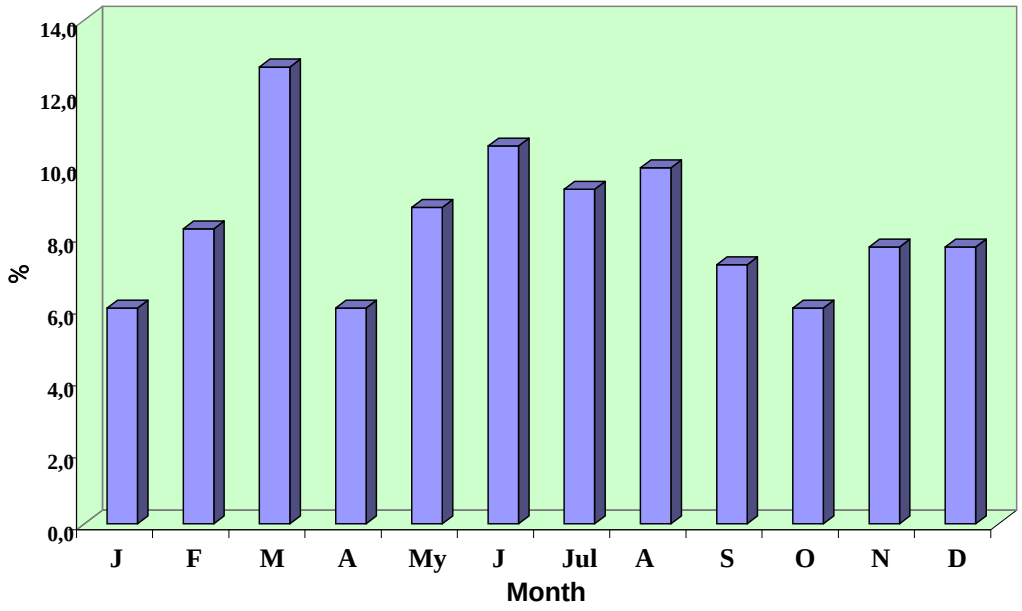


Table 5. Type of Cancer

Cluster	Subgroup	No. Cases
A) Mouth cancer: 4		
	Cancer in the mouth	4
B) Cancer of the stomach, liver: 46		
	Stomach cancer	32
	Stomach scirrhus	2
	Carcinoma of the stomach	1
	Pylorus cancer	2
	esophageal cancer	1
	Liver cancer	5
	Cancerous scirrhum in liver	1
	hepatic scirrhus	2
C) Cancer of the intestines, rectum: 6		
	intestinal cancer	2
	Cancer of the rectum	1
	rectal cancer	3
D) Cancer of the female genital organs: 34		
	Cancer of the womb	14
	Cancerous ulcer of the womb	1
	Uterus cancer	18
	Uterine carcinoma	1
E) Breast cancer: 13		
	breast cancer	1
	breast cancer	2
	Tumor in the chest	1
	Zaratan	8
	in a chest	1
F) Skin cancer: 6		
	Cancer of the face	2
	Epithelioma of the face	1
	nose cancer	2

	Ulcerated cancer of the nose	1

Table 6. Unclassified cancers.

Cluster	Subgroup	No. Cases
Cancer of other organs: 73		
	bladder cancer	1
	Laryngeal cancer	1
	cancerous laryngitis	1
	Cancer of one eye	1
	breast cancer	1
	cancerous ulcer	2
	Cancerous ulcer ending with gangrene	1
	Carcinomatous ulcer	1
	cancerous angina	2
	Tumorous angina	1
	Cancer	36
	Ulcerated	3
	Tumor	8
	Cancerous	4
	Scrofulous	3
	Gangrenous	2
	In the womb	1
	Scirrhus tumors	1
	Scirrhus	1
	Ulcerated	1
	On the right hand	1

The leading cause of lung cancer worldwide is smoking [27]. Although tobacco did not enter Spain until after Columbus's first voyage, which brought it from America in 1492 and was even thought to have beneficial effects on health, it was not until the end of the 19th century, and especially the beginning of the 20th, when the definitive boom in production and consumption developed [28]. All of these factors may partly explain the absence of deaths due to lung tumors in the present work, together with more than possible underreporting due to the lack of diagnostic methods and scientific knowledge typical of the time [29, 30].

Specific studies in nearby towns show figures similar to those found in Jerez. Thus, in an analysis that covers 1800 to 1870, Barajas Álvarez in Villanueva del Fresno reported 6,394 deaths, 3,666 of which were the cause of death detailed; 23 deceased, ill-defined cancers were the most common, with 11 cases [31].

Similarly, Pineda Núñez, in Los Santos de Maimona, reported 422 deaths from cancer, 2% of which were total mortality; the divergence is that his work extended until 1992, with 29,885 deaths and 21,179 deaths at diagnosis [32].

According to the analysis of Olivenza at the hands of Fernández-López, 20,590 deaths occurred, 15,950 of which were deaths. The author described 102 cancers, representing 0.63% of the total mortality, with unspecified tumors being the most frequent, with 33 cases [33].

Finally, Amador-Fernández, in his magnificent work on Almendralejo, reported 26,837 deaths and 20,483 deaths, detailing 224 deaths due to cancer, which amounted to 1.1% of the town's overall mortality during the 19th century. The stomach and liver were the most common organs, with 44 deaths [34].

Conclusions

Cancer of other organs was the most common, with 73 deaths. The mortality figures from cancer during the 19th century differed between the different populations compared, depending on the number of fatalities found and the period covered by the studies. The number of

deaths is much lower than the current number, undoubtedly due to the lack of diagnostic methods and incomplete data collection, which may imply the occurrence of underrecording.

Abbreviations

s. XIX: 19th century.

Administrative information

Additional Files

None declared by the authors.

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Author contributions

Francisco Javier Suárez-Guzmán: conceptualization, validation, visualization, methodology, project administration, writing: review and editing, data curation, formal analysis, acquisition of funds, research, resources, software.

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Availability of data and materials

The data are available upon request to the corresponding author. No other materials were reported.

Statements

Ethics committee approval

A history of medical studies was not needed.

Consent for publication

Patient-specific images, MRIs, or CT studies were not available when they were not published.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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