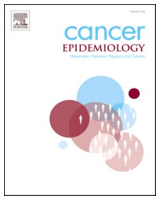
Cancer Epidemiology 94 (2025) 102720

Contents lists available at ScienceDirect

Cancer Epidemiology

journal homepage: www.elsevier.com/locate/canep



Trends in ovarian cancer net survival in a northeastern Brazilian state (1996–2017)

Brenda Evelin Barreto da Silva [a,*], Pamela Minicozzi [b], Veronica Di Carlo [b], Naomi Ssenyonga [b], Fatima Khan Baloch [b], Melissa Matz [b], Michel P. Coleman [b], Claudia Allemani [b], Carlos Anselmo Lima [a,c,d]

[a] Health Sciences Graduate Program, Federal University of Sergipe, Aracaju, Sergipe, Brazil
[b] Cancer Survival Group, Faculty of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, London, UK
[c] Aracaju Cancer Registry, Aracaju, Sergipe, Brazil
[d] University Hospital, Ebserh, Federal University of Sergipe, Aracaju, Sergipe, Brazil

ARTICLE INFO

Keywords:
Ovarian cancer
Epidemiology
Population-based survival
Histology
Brazil

ABSTRACT

Background: Ovarian cancer survival in low- and middle-income countries is lower than in high-income countries, due to disparities in healthcare access and socioeconomic factors. This study aimed to describe trends in ovarian cancer survival in Sergipe, Northeast Brazil, by histological group.

Methods: We analysed data on 948 women aged 15–99 years diagnosed with a cancer of the ovary between 1996 and 2017, in Sergipe, Brazil. One- and five-year net survival were estimated by histological group and calendar periods of diagnosis (1996–1999, 2000–2004, 2005–2009, 2010–2014, 2015–2017) using the Pohar-Perme estimator. Survival estimates were age-standardised using International Cancer Survival Standard weights.

Results: Between 1996 and 2017, one-year and five-year net survival for ovarian cancer were 63.4 % and 37.4 %, respectively. Five-year net survival trends increased from 30.9 % (2000–2004) to 46.8 % (2015–2017). Epithelial type I tumours comprised roughly a quarter of cases, while type II tumours constituted over half. Both types exhibited similar one-year survival, ranging from 67 % to 68.5 % during 1996–2017. However, five-year net survival for type II tumours was remarkably lower at 32.5 %, compared to 52 % for type I tumours.

Conclusion: Despite a minor improvement in five-year net survival over the 22 years, survival for women with ovarian cancer remains unfavourable, particularly for those diagnosed with Type II epithelial tumours, which have remarkably lower five-year survival than Type I.

1. Introduction

Ovarian cancer presents a major global health challenge due to its high mortality and limited survival, often linked to late-stage diagnoses. Worldwide, it ranks as the seventh most common cancer among women and the sixth leading cause of cancer-related mortality. Incidence varies by region, with higher rates typically observed in developed countries. However, survival outcomes show an opposite trend, with better survival reported in developed countries compared to low- and middle-income countries. These disparities are largely driven by differences in access to healthcare, diagnostic resources, and effective treatment options [1–3].

Understanding population-based cancer survival trends (net survival) for ovarian cancer is essential for evaluating the effectiveness of healthcare systems, guiding public health policies, and improving patient care strategies. While ovarian cancer survival studies are extensive in high-income countries [2,4,5], there is a relative paucity of data from low- and middle-income regions, including Brazil.

In Brazil, ovarian cancer ranks as the seventh most common cancer among women and the eighth leading cause of cancer death [3]. National estimates from the CONCORD-3 study indicate that survival for ovarian cancer declined from 42.1 % in 2000–2004 to 34.9 % in 2010–2014 [6], underscoring the need for continuous and updated monitoring of survival trends.

* Correspondence to: Federal University of Sergipe, Cláudio Batista Street, Aracaju, Sergipe 49060-100, Brazil.
E-mail addresses: brendaevelinbarreto@gmail.com (B.E.B. da Silva), pamela.minicozzi@lshtm.ac.uk (P. Minicozzi), veronica.dicarlo@lshtm.ac.uk (V. Di Carlo), naomi.ssenyonga@lshtm.ac.uk (N. Ssenyonga), fatima.khan@lshtm.ac.uk (F. Khan Baloch), melissa.matz@lshtm.ac.uk (M. Matz), michel.coleman@lshtm.ac.uk (M.P. Coleman), claudia.allemani@lshtm.ac.uk (C. Allemani), ca.lima01@gmail.com (C.A. Lima).

https://doi.org/10.1016/j.canep.2024.102720
Received 15 September 2024; Received in revised form 10 November 2024; Accepted 26 November 2024
Available online 16 December 2024

Despite the robustness of net survival as a metric for assessing cancer outcomes, its application in Brazil has been notably limited, with only three local cancer registries contributing ovarian cancer data to the CONCORD-3 study [6]. A recent study conducted in the Barretos region in northwestern São Paulo provided valuable net survival estimates for ovarian and other cancers, based on diagnoses from 2000 to 2018, yielding important insights specific to that area [7]. Nevertheless, comprehensive, region-specific data on ovarian cancer survival remains limited in other parts of Brazil.

The high-quality cancer registry in Sergipe, a state in the northeast of Brazil, provides a unique opportunity to expand this analysis. This study aims to address this gap by providing a comprehensive, population-based analysis of net survival for ovarian cancer by histological subtype in Sergipe from 1996 to 2017, contributing essential data to inform regional cancer control strategies and improve patient care.

2. Material and methods

This study analysed data from Sergipe, a northeastern Brazilian state encompassing 22,000 km^2 and comprising 75 municipalities. According to the 2022 Census, Sergipe has a population of approximately 2.2 million. Aracaju, the state capital, and primary regional healthcare centre, has a population of 602,757. Since 1996, Sergipe has had a Population-Based Cancer Registry (PBCR) located in Aracaju. The Aracaju Cancer Registry is well-established, with high-quality data, enabling population-based cancer studies.

We analysed individual records of women aged 15–99 years who were diagnosed with a malignant primary neoplasm of the ovary (International Classification of Diseases for Oncology - ICD-O-3 topography code C56.9) [8], from 1996 to 2017, with follow-up for their vital status until December 31, 2022. The definition of ovarian cancer was expanded to include peritoneal and retroperitoneal tumours (C48.0–C48.2), tumours of overlapping sites of the retroperitoneum and peritoneum (C48.8), and other and unspecified female genital organs (C57.0–C57.4 and C57.7–C57.9).

This expansion is based on evidence indicating that high-grade serous carcinoma, the most common type of ovarian cancer, originates in the fallopian tube. Primary peritoneal malignancies are managed similarly to advanced-stage epithelial ovarian cancer. Additionally, tumours of the uterine ligaments, adnexa, other unspecified female genital organs, and the retroperitoneum are included due to their anatomical proximity to the ovaries, fallopian tubes, and peritoneum [1,6,9,10].

Based on scientific literature [1,11,12], we defined four histological groups for ovarian cancer: epithelial type I, epithelial type II, germ cell tumours, and other specified morphologies (Supplementary Table 1). Epithelial type I includes clear cell, endometrioid, mucinous, squamous, and transitional cell (Brenner) carcinomas. Epithelial type II comprises serous carcinomas, epithelial-stromal tumours, and undifferentiated or other epithelial carcinomas, with both low-grade and high-grade serous carcinomas included due to the lack of grade information. Germ cell tumours encompass teratomas and dysgerminomas. Sex cord-stromal tumours and other specific non-epithelial morphologies were grouped under "other specified morphologies".

The study received approval from the Research Ethics Committee of the Federal University of Sergipe (Reference 3.714.982), in accordance with relevant guidelines and regulations. The committee waived the requirement for informed consent due to the use of anonymised patient databases.

To perform the survival analysis, a passive follow-up method was applied to determine the vital status and the date of the last known vital status. The verification of deaths, regardless of the cause, was conducted by accessing death records from the Sergipe Mortality Information System, which compiles vital statistics at the state level.

Women data were matched with death records using demographic information and, where available, unique personal identification numbers. Women whose tumour records did not correspond with a death record were presumed to be alive until the follow-up date of December 31, 2022.

For cases where death information was incomplete, further details were sought from the National Registry of Deceased Persons, the Federal Revenue Service, the Brazilian Electoral System, and the National Health Registry. This process was undertaken to ensure the accuracy of the data and to address potential issues like 'immortal time bias,' which could influence the results of the survival analysis.

2.1. Quality data control procedures

The database underwent rigorous data quality control procedures as developed for the VENUSCANCER project, which is embedded in the CONCORD programme and aims to investigate global disparities in patterns of care and short-term survival from breast, cervical, and ovarian cancer [13].

Supplementary Fig. 1 presents the criteria for data exclusion. Following data quality control, 63 women (6.1 %) out of the 1131 registered with ovarian cancer were excluded from the analysis. This exclusion was due to incomplete dates, benign or uncertain behaviour tumours, or ages falling outside the 15–99 years range. Among 1068 eligible women, 109 cases (10.2 %) recorded only on death certificates, seven with an age-morphology mismatch, and one with invalid date were excluded. Data for the remaining 948 women (88.8 % of those eligible) were included in survival analyses. Analysis of survival by histological group was restricted to the 897 tumours that were microscopically verified and had specific ICD-O-3 morphology codes (84.0 % of those eligible).

2.2. Statistical analysis

The study monitored women diagnosed over a 22-year period, with annual follow-ups conducted until 31 December 2022.

The cohort approach was employed to estimate survival among women diagnosed within all five calendar periods, for which at least five years of follow-up were available (Supplementary Fig. 2).

Net survival at one and five years after ovarian cancer diagnosis was estimated by five calendar periods of diagnosis (1996–1999, 2000–2004, 2005–2009, 2010–2014, and 2015–2017) and histological group, using the Pohar Perme estimator, implemented through the *stns* program in Stata version 18 [14,15].

Net survival can be interpreted as the probability for cancer patients to survive their cancer after controlling for competing risks of death (background mortality), which are higher in the elderly [14]. To account for background mortality, complete life tables of all-cause mortality rates among women in Sergipe (ages 0–99) were constructed for each calendar year from 1996 to 2022, using the numbers of deaths and female population counts by age group and calendar year. Mortality rates were derived using a flexible Poisson model for the years 1997, 2010 and 2018, incorporating data from three adjacent calendar years around each central year to address year-to-year variability. Interpolated data were used to bridge gaps for intermediate years, while data duplication addressed the earliest and latest years [16]. Mortality rates for 2019, 2020, and 2021 were individually modelled to take into account of the fluctuations arising from the impact of the COVID-19 pandemic on mortality and demographic dynamics.

Survival estimates were produced for five age groups (15–44, 45–54, 55–64, 65–74, and 75–99 years). Age-standardised estimates for all age groups combined were derived using the International Cancer Survival Standard (ICSS) group 1 weights [17]. In cases where age-specific estimates could not be produced or fewer than ten women were available for analysis in an age group, data from adjacent age groups were combined, and the re-estimated survival was applied to both original age groups. If two or more age-specific estimates were unattainable, or fewer than ten women were available for analysis in two or more age groups, only the unstandardised estimate was reported.

Cumulative probabilities of survival were reported as percentages, truncated within the range of 0–100 %. Standard errors were determined using the Greenwood method [18], with 95 % confidence intervals.

3. Results

The study population consisted of 948 women diagnosed with ovarian cancer between 1996 and 2017 in Sergipe, Brazil. The majority of cases were ovarian tumours (C56.9), accounting for 898 cases (94.7 %), followed by tumours of the peritoneum and retroperitoneum (30 cases, 3.2 %) and tumours of other unspecified female genital organs (20 cases, 2.1 %). Type II epithelial ovarian tumours were the most common histological group, representing 532 cases (56.1 %). Type I epithelial tumours comprised 236 cases (24.9 %). Germ cell tumours and other specified morphologies accounted for 48 cases (5.1 %) and 55 cases (5.8 %), respectively. The proportion of type II epithelial tumours was 49.6 % in 1996–1999 and 65.8 % in 2015–2017, while the proportion of type I epithelial tumours was 29.6 % and 20.3 % over the same periods (Table 1).

One-year net survival was similar for women aged 15–44 (73.8 %; 68.2–79.5) and 45–54 (74.5 %; 68.5–80.4) years. Survival estimates at one and five years were lower in older age groups (Table 2; Fig. 1).

When considering net survival estimates over the whole study period (1996–2017), age-standardised net survival at one and five years for women diagnosed with ovarian cancer was 63.4 % (59.6–67.4) and 37.4 % (33.5–41.8), respectively. However, when looking at the results by periods of diagnosis, from 1996–1999 to 2000–2004, there was a decline in both one- and five-year survival estimates, followed by an increase until 2015–2017. One-year survival estimates increased from 60.1 % (53.0–68.2 %) for women diagnosed between 2000 and 2004 to 69.7 % (62.5–77.8 %) for those diagnosed in 2015–2017, while five-year survival rose from 30.9 % (24.0–39.9 %) to 46.8 % (38.3–57.1 %), respectively (Table 3).

Age-standardised one-year net survival for women diagnosed during the period 1996–2017 with epithelial type I tumours (68.5 %; 61.3–76.5) was similar to that for type II tumours (66.8 %; 62.0–72.0). However, five-year survival for women diagnosed with type II epithelial tumours was 32.5 % (27.6–38.1), compared to 51.8 % (43.3–62.0) for women diagnosed with type I tumours (Table 4).

Table 5 illustrates one- and five-year net survival by histological groups and calendar period of diagnosis. Age-standardised results are provided for type II epithelial tumours from 2000 to 2017, due to the limited number of cases. Age-standardised one-year survival for type II tumours demonstrated fluctuations, declining from 75.5 % (65.2–88.4) for women diagnosed during 2000–2004 to 65.8 % (55.5–77.8) in 2005–2009, before experiencing a slight increase to 68.9 % (60.6–78.3) for those diagnosed in 2015–2017. Five-year survival exhibited an upward trend, ranging from 26.7 % (19.3–37.1) in 2000–2004 to 37.2 % (28.4–48.8) in 2015–2017.

Table 2
One- and five-year net survival (%) by age group, with 95 % confidence intervals: women diagnosed with ovarian cancer, Sergipe, Brazil, 1996–2017.

Age group	One-year NS	95 % CI		Five-year NS	95 % CI	
15–44	73.8	68.2	79.5	54.3	47.9	60.8
45–54	74.5	68.5	80.4	48.5	41.6	55.4
55–64	67.9	61.8	74.0	43.2	36.5	49.9
65–74	63.7	55.8	71.5	35.1	26.7	43.5
75–99	52.5	43.1	61.9	26.4	16.6	36.2

NS, net survival. CI, confidence interval.

4. Discussion

Examination of net survival among women diagnosed with ovarian cancer in Sergipe, a state in the northeast of Brazil, from 1996 to 2017, demonstrates advancements over time. Initially, both one-year and five-year survival declined, succeeded by a gradual increase in more recent periods.

Ovarian cancer is acknowledged as the most lethal form of cancer affecting women [3], exhibiting notably low survival estimates worldwide [6]. This condition presents significant challenges even in developed countries, where healthcare systems are more advanced, due to late diagnosis, aggressive tumour biology, variability in treatment response, and the diversity of subtypes with different prognoses [1,2,19].

In developing countries, the situation is worsened by challenges in accessing optimal treatment and the insufficiency of medical resources and adequate infrastructure. Consequently, many women are deprived of early diagnosis and treatment, impeding effective management of ovarian cancer and impacting survival significantly in these regions [19].

The third cycle of the CONCORD programme (CONCORD-3) for the

Table 1
Women with ovarian cancer (%), by age group, topography, and histological groups, and calendar period of diagnosis. Sergipe, Brazil, 1996–2017.

Variables	1996–1999		2000–2004		2005–2009		2010–2014		2015–2017		All calendar periods	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Age group (years)												
15–44	25	20.0	43	22.6	48	25.3	71	27.7	45	24.1	232	24.5
45–55	29	23.2	45	23.7	42	22.1	56	21.9	37	19.8	209	22.1
56–64	31	24.8	44	23.2	54	28.4	66	25.8	37	19.8	232	24.5
65–74	21	16.8	33	17.4	25	13.2	34	13.3	40	21.4	153	16.1
75–99	19	15.2	25	13.2	21	11.1	29	11.3	28	15.0	122	12.9
Total	125	13.2	190	20.0	190	20.0	256	27.0	187	19.7	948	100.0
Topography												
Ovary[a]	113	90.4	178	93.7	179	94.2	246	96.1	182	97.3	898	94.7
Peritoneum and retroperitoneum[b]	6	4.8	11	5.8	5	2.6	7	2.7	1	0.5	30	3.2
Unspecified female genital organs[c]	6	4.8	1	0.5	6	3.2	3	1.2	4	2.1	20	2.1
Histological Group												
Epithelial type I	37	29.6	58	30.5	46	24.2	57	22.3	38	20.3	236	24.9
Epithelial type II	62	49.6	83	43.7	106	55.8	158	61.7	123	65.8	532	56.1
Other specified morphologies	10	8.0	20	10.5	9	4.7	13	5.1	3	1.6	55	5.8
Germ cells	5	4.0	7	3.7	13	6.8	10	3.9	13	7.0	48	5.1
Unknown morphologies	8	6.4	18	9.5	10	5.3	10	3.9	5	2.7	51	5.4
Unspecified tumours	3	2.4	4	2.1	6	3.2	8	3.1	5	2.7	26	2.7

[a] Malignant neoplasm of ovary (ICD-O-3 code: C56.9).
[b] Malignant neoplasm of retroperitoneum and peritoneum (ICD-O-3 codes: C48.0–C48.2; C48.8).
[c] Malignant neoplasm of other and unspecified female genital organs (ICD-O-3 codes: C57.0–C57.4, C57.7–C57.9).

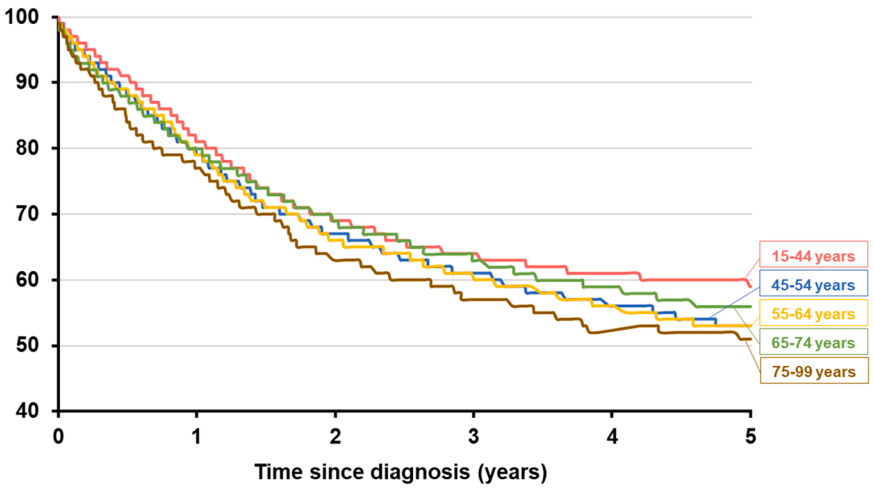


Fig. 1. Age-specific net survival (%): women diagnosed with ovarian cancer, Sergipe, Brazil, 1996–2017.

Table 3
Age-standardised one- and five-year net survival (%), by calendar period of diagnosis, with 95 % confidence intervals: women diagnosed with ovarian cancer, Sergipe, Brazil, 1996–2017.

Period of diagnosis	One-year NS	95 % CI		Five-year NS	95 % CI	
1996–1999	**64.8**	55.5	75.7	**44.1**	33.7	57.6
2000–2004	**60.1**	53.0	68.2	**30.9**	24.0	39.9
2005–2009	**59.8**	51.3	69.7	**33.2**	25.6	42.9
2010–2014	**61.6**	54.3	69.9	**35.2**	28.1	44.1
2015–2017	**69.7**	62.5	77.8	**46.8**	38.3	57.1

NS, net survival. CI, confidence interval.

Table 4
One- and five-year net survival (%), by histological group and age range, with 95 % confidence intervals: women diagnosed with ovarian cancer, Sergipe, 1996–2017.

Histological group	Age group	One-year NS	95 % CI		Five-year NS	95 % CI	
Epithelial type I	All ages*	**68.5**	61.3	76.5	**51.8**	43.3	62.0
	15–44	*61.9*	49.2	74.6	*40.4*	27.6	53.3
	45–54	*76.2*	65.2	87.1	*56.5*	43.6	69.5
	55–64	*60.9*	48.4	73.5	*53.4*	39.8	66.9
	65–74	*78.2*	64.6	91.9	*64.5*	46.3	82.7
	75–99	*63.1*	44.0	82.2	*38.6*	15.3	61.8
Epithelial type II	All ages*	**66.8**	62.0	72.0	**32.4**	27.6	38.1
	15–44	*85.2*	78.5	91.9	*56.6*	47.2	66.0
	45–54	*76.6*	68.9	84.3	*44.3*	35.2	53.3
	55–64	*69.9*	62.3	77.5	*35.0*	26.9	43.2
	65–74	*63.2*	53.2	73.2	*24.8*	15.3	34.3
	75–99	*59.4*	47.1	71,6	*27.3*	14.3	40.3
Germ cells	All ages	*75.1*	63.0	87.2	*69.3*	56.3	82.4
	15–44	*77.0*	64.0	90.0	*74.7*	61.2	88.2
	45–54	-	-	-	-	-	-
	55–64	-	-	-	-	-	-
	65–74	-	-	-	-	-	-
	75–99	-	-	-	-	-	-
Other specified morphologies	All ages	*60.9*	47.9	74.0	*45.6*	31.2	59.9
	15–44	*71.6*	48.8	94.3	*57.8*	32.8	82.8
	45–54	*54.8*	27.1	82.5	*37.4*	10.5	64.4
	55–64	*77.8*	55.6	99.9	*57.8*	30.3	85.3
	65–74	-	-	-	-	-	-
	75–99	-	-	-	-	-	-

NS, net survival. CI, confidence intervals.
Survival estimates are presented in *italics* for non-age-standardised values and in **bold** for age-standardised values.
* Age-standardised net survival.

global surveillance of cancer survival trends, underscores remarkable disparities in ovarian cancer survival worldwide. For instance, women in nations such as Japan, the United States, and certain European countries showed higher survival estimates than those in countries across Africa, Asia, and Latin America. In Brazil, the five-year net survival showed a decline from 2000–2004 to 2010–2014, highlighting the need for ongoing surveillance and targeted interventions [6].

In Sergipe, five-year survival declined from 44.1 % for women diagnosed in 1996–1999 to 30.9 % in 2000–2004, followed by a gradual increase to 46.8 % in 2015–2017. One possible hypothesis for the initial decline could be related to limitations in early data collection or tumour coding practices, potentially impacting survival estimates from that period. The recent improvement in survival suggests enhancements in diagnostic, treatment, and follow-up protocols for ovarian cancer within the state.

However, despite these advancements, five-year survival estimates remain low across the entire cohort, indicating persistent challenges in comprehensive cancer care and access to early detection and specialised treatments. Other contributing factors likely include limited epidemiological data to guide public health policies, lack of awareness about ovarian cancer and its risk factors, and restricted access to screening, diagnostic tests, and skilled healthcare professionals [19,20].

Age at diagnosis, tumour histology, and disease stage are critical determinants of ovarian cancer survival [1,4,19–21]. Understanding their distributions and their impact on survival is vital for informing policy and practice improvements. Our study found that survival decreases with increasing age at ovarian cancer diagnosis among women in Sergipe, with the lowest survival estimates observed in older age groups. These findings are consistent with previous research, which has also demonstrated reduced survival in older women with ovarian cancer [4,5,22,23].

The decline in survival with age can be attributed to late disease detection, often at advanced stages, and limitations in therapeutic options [5,24,25]. Elderly patients are less likely to receive definitive treatments like chemotherapy or surgery, often receiving less aggressive therapies [24,26]. Additionally, the presence of comorbidities can compromise treatment response, heightening the risk of complications [27].

Ovarian cancer control in Brazil faces substantial challenges, as evidenced by data from Hospital Cancer Registries [28]. Diagnosis at advanced stages is common, particularly in the northeast region, with

Table 5
One- and five-year net survival (%), by histological group and calendar period of diagnosis, with 95 % confidence intervals: women diagnosed with ovarian cancer, Sergipe, 1996–2017.

Histological group	Calendar period	One-year NS	95 % CI		Five-year NS	95 % CI	
Epithelial type I	1996–1999	*63.2*	47.6	78.8	*38.6*	21.7	55.5
	2000–2004	*63.0*	50.6	75.5	*36.9*	23.7	50.2
	2005–2009	*74.7*	62.0	87.3	*51.3*	36.0	66.7
	2010–2014	*67.5*	55.4	79.6	*57.2*	43.3	71.0
	2015–2017	*85.1*	73.5	96.6	*76.6*	610	92.2
Epithelial type II	1996–1999	*73.5*	62.4	84.6	*42.9*	29.5	56.3
	2000–2004*	**75.9**	65.2	88.4	**26.7**	19.3	37.1
	2005–2009*	**65.8**	55.5	77.8	**29.0**	20.8	40.6
	2010–2014*	**66.5**	57.8	76.5	**29.0**	22.0	38.1
	2015–2017*	**68.9**	60.6	78.3	**37.2**	28.4	48.8
Germ cells	1996–1999	-	-	-	-	-	-
	2000–2004	-	-	-	-	-	-
	2005–2009	*69.3*	45.4	93.3	*62.2*	36.8	87.7
	2010–2014	*70.0*	43.3	96.8	*60.4*	31.8	89.1
	2015–2017	*92.4*	78.4	100.0	*92.9*	78.9	100.0
Other specified morphologies	1996–1999	*40.8*	12.2	69.4	*33.8*	4.3	63.3
	2000–2004	*65.7*	45.1	86.3	*32.2*	10.6	53.9
	2005–2009	-	-	-	-	-	-
	2010–2014	*77.0*	55.1	98.9	*52.0*	23.4	80.5
	2015–2017	-	-	-	-	-	-

NS, net survival. CI, confidence intervals.
Survival estimates are presented in *italics* for non-age-standardised values and in **bold** for age-standardised values.
* Age-standardised net survival.

delayed treatment initiation and early deaths after first-line treatment [28]. These findings underscore the urgent need for enhancing the quality of care for women diagnosed with ovarian cancer in Brazil. Difficulties in accessing healthcare services, early diagnosis, and timely treatment present additional barriers to improving survival in this population, compounding the inherent challenges of the disease.

Tumour histology also significantly influences ovarian cancer survival. Type I epithelial tumours have a more favourable prognosis than type II epithelial tumours, which are often diagnosed at advanced stages. Moreover, germ cell tumours, although less common, typically occur in younger women and carry a more favourable prognosis than type II epithelial tumours [1,12].

Globally, type II epithelial tumours are the most common, followed by type I epithelial tumours, with germ cell tumours and other non-epithelial tumour types accounting for a smaller proportion of cases. During 1995–2009, type I epithelial, germ cell, and sex cord-stromal tumours showed higher survival estimates than type II epithelial tumours, which are more aggressive [12].

Large disparities in the survival of epithelial tumours were identified in our study. Although one-year survival for type I and type II epithelial tumours was comparable, five-year survival for type II tumours was notably lower than for type I tumours, with a difference of 20 % (32 % versus 52 %). Internationally, type I epithelial tumours showed relatively higher five-year survival, typically ranging between 50 % and 70 %, while type II epithelial tumours showed substantially lower survival estimates, ranging between 20 % and 45 % [1].

Data from four Brazilian cancer registries indicated that the five-year survival for type I epithelial tumours between 2000 and 2009 ranged from 40 % to 47 %. Conversely, the survival for type II tumours demonstrated a declining trend, decreasing from 38 % in the period 2000–2004 to 29 % during 2005–2009 [1].

In Sergipe, however, an opposite trend was observed. Age-standardised five-year survival for type II tumours showed a slight increase, from 26.7 % in 2000–2004 to 29 % in 2005–2009, reaching 37.2 % by 2015–2017. This discrepancy may reflect differences in data quality, tumour coding practices, and collection methods across regions, as well as variations in the distribution of stages at diagnosis. These factors underscore the need to account for regional variations when assessing survival in distinct types of ovarian tumours. Further research would be valuable to explore these potential influences on ovarian cancer survival in different regions of Brazil.

The study faces certain limitations, including the lack of data on the stage at diagnosis, which may affect the depth and accuracy of the findings. Additionally, age standardisation was not possible for all subtypes due to the small number of cases. As a result, non-age-standardised survival estimates were presented alongside age-standardised ones. Differences between the non-age-standardised and age-standardised estimates may arise due to variations in the age distribution across diagnostic periods and histological subtypes, which could influence the observed survival. This approach was chosen to provide a more comprehensive view of the data, despite the limitations of non-age-standardised estimates.

Nevertheless, this study offers a detailed analysis of ovarian cancer survival in Sergipe, Brazil, over a 22-year period. We used data from the Aracaju Cancer Registry, which is recognised for its high quality and validity, enhancing the reliability of the analyses. Furthermore, rigorous quality control measures and robust methodologies were applied to ensure the accuracy and integrity of the results.

5. Conclusion

This study represents the first comprehensive analysis of net survival across two decades and by histological groups in Sergipe. The findings reveal improvements in both one-year and five-year survival in recent years. However, five-year net survival estimates remain low, especially among older age groups, with Type II epithelial tumours showing notably poorer survival compared to Type I. These results underscore the urgent need for policy reforms and healthcare strategies focused on strengthening early detection and treatment efforts, leading to enhanced survival from ovarian cancer.

CRediT authorship contribution statement

Veronica Di Carlo: Methodology, Formal analysis, Data curation. **Naomi Ssenyonga:** Formal analysis, Data curation. **Michel P Coleman:** Writing – review & editing, Supervision, Methodology, Formal analysis. **Claudia Allemani:** Writing – review & editing, Supervision, Methodology, Formal analysis. **Fatima Khan Baloch:** Formal analysis, Data curation. **Melissa Matz:** Methodology, Data curation. **Brenda Evelin Barreto da Silva:** Writing – review & editing, Writing – original draft,

Methodology, Formal analysis, Data curation, Conceptualization. **Carlos Anselmo Lima:** Writing – review & editing, Supervision, Methodology, Formal analysis, Data curation, Conceptualization. **Pamela Minicozzi:** Methodology, Formal analysis, Data curation.

Declaration of Competing Interest

The authors declare that they have no conflicts of interest to disclose.

Acknowledgments

We would like to express our sincere gratitude to the professionals at the Aracaju Cancer Registry (José Erinaldo L. de Oliveira, Elma Oliveira, Maria das Graças P. França, Sueli Vieira, Marina Kobilsek, Maria Cristina Santos, Maria das Graças Melo, Josiane Alves, Amanda Gonzaga, Alneide Leite, and Cecília Ferreira) for their invaluable involvement in the data collection and preparation of the database for this research.

This study was financed in part by The Brazilian National Council for Scientific and Technological Development (CNPq), Grant 200465/2022-8.

Conflict of Interest statement

The authors declare no conflicts of interest related to this research study.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.canep.2024.102720.

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