Journal of Applied Health Sciences and Medicine, 6(5):31–38, 2026. DOI: 10.58614/jahsm654

Journal of Applied Health Sciences and Medicine

Journal homepage: https://jpub.org/journal-details.php?journal-id=39

Research Article

Statistics of the Types of Cancers Prevalent in Najaf Registered at the National Cancer Hospital in 2023 and 2024

Ghadeer Mohammed Hussain [1*] **and Fadak Mansour Abd El Redha** [2]

[1] *Department of Radiology, College of Health and Medical Technology, University of Alkafeel, Najaf, Iraq.*
[2] *Department of Anesthesia, College of Health and Medical Technology, University of Alkafeel, Najaf, Iraq.*
[*] *Corresponding author: ghadeer.mohammed@alkafeel.edu.iq*

Article Info

Keywords: *Cancer in Najafi, Prevalent Cancer, National Cancer Hospital, 2023-2024 Statistics.*

Received: *12.04.2026;*
Accepted: *18.05.2026;*
Published: *25.05.2026*

Abstract

Background: One of the most deadly illnesses in the world, especially in Iraq, is cancer. In recent years, there has been a discernible increase in the spread of this disease in all its manifestations. It still poses a serious risk to human health despite improvements in treatment techniques. In order to ascertain the rates of incidence growth, pinpoint the places with the greatest rates, and try to comprehend the causes of the rise in cases in these areas, a number of research are being carried out. As is well recognized, there are several causes of cancer, including chemical contaminants, environmental factors, and hereditary factors.
Methods: This study was conducted in 2025 in the city of Najaf, Al-Kafeel University, after collecting the medical records of cancer patients residing exclusively in the city of Najaf from the National Oncology Hospital for the years 2023 and 2024. The variables analyzed included age, gender, type of cancer, and residential area (neighborhood). We performed the statistical analysis by using the Chi-square test to express the assess associations between variables. A p-value <0.05 was considered statistically significant.
Results: We recorded 1227 cancer cases in 2023 and 1261 cases in 2024, indicating a slight increase in the incidence rate between the two years. Females comprised the majority of cases in both years (57.9% and 57.1%), and we did not observe any statistically significant difference in age and gender distribution between the two years ($p > 0.05$). Regarding residential areas ($p = 0.042$), we observed variations, with the districts of Kufa and Najaf recording the highest incidence rates. As for cancer types we observed significant variations in distribution ($p = 0.043$), with breast cancer remaining the most common among females and prostate and lung cancer the most common among males. There was also an increase in thyroid cancer among women.

1. Introduction

Iraq is not an exception to the fact that cancer is still one of the world's most urgent public health issues. The Najaf Governorate has seen a worrying increase in cancer cases in recent years, which is consistent with larger regional and national trends [1]. According to Ministry of Health statistics from 2016, cancer is always regarded as a serious health issue and the second most common cause of death in Iraq [2]. The Middle Euphrates Oncology Hospital, the main cancer care facility in the area, handled 1,340 of the more than 1,800 cancer cases that were reported in 2024 alone, according to data from the Najaf Health Directorate. With 26.8% of cases, breast cancer was the most common type of cancer, followed by lung cancer (7.4%) and leukemia (3.7%). Notably, the majority of leukemia cases affected those under the age of 20, and cases were equally divided between males and females [3]. Significant cancer clusters were found in a number of

Najaf districts, including Al Saad, Al Muthanna, Al Ghadeer, and Al Rahmaa, according to geospatial research done between 2020 and 2023 [4]. These results point to possible risk factors connected to lifestyle or the environment that may be behind the localized increase in cancer cases [4]. High-risk areas have been identified with the aid of spatial scan statistics and kernel density estimation, which can guide future resource allocation and public health initiatives [4]. In addition to providing statistical data, this study aims to place Najaf's cancer situation in the perspective of larger socioeconomic and healthcare dynamics. We hope to contribute to a more knowledgeable and adaptable healthcare plan that targets both prevention and treatment in a quickly changing public health environment by analyzing the cancer kinds most common in 2023 and 2024. Raising public awareness and educating people about the gravity of cancer is the main objective of the study. Additionally, it seeks to promote early screening in order to identify the illness and make treatment easier. Additionally, by identifying the most common forms and residential areas with the highest occurrence, the research seeks to determine the cause by connecting them to the local environmental circumstances.

Objectives of study

1. To determine the total number of cancer cases registered at the Oncology Hospital for the years 2023 and 2024, and study the distribution of cancer cases by age and gender.
2. To identify the most common types of cancer for males and females.
3. To examine the geographical distribution of cancer cases across residential districts in Najaf.
4. To assess temporal changes in cancer patterns between 2023 and 2024 and explore possible associations with local environmental factors.

Aim of study

To evaluate the incidence and distribution of cancer cases in Najaf city during 2023–2024, and to identify the most prevalent cancer types and their geographical patterns in relation to demographic and environmental factors.

2. Methods

The study was conducted in the city of Najaf, Iraq, in 2025. Patient data were collected from the medical records of cancer patients at the National Oncology Hospital in Najaf for the years 2023 and 2024. Data were compared in terms of age, gender, type of cancer, and residential districts of the patients by Chi square test.

3. Result

This statistical study was conducted at Al-Kafeel University by taking the medical records of cancer patients at the National Oncology Hospital in Najaf for the years 2023 and 2024. The number of registered patients from the city of Najaf was 1227 and 1261, respectively. The data were then compared in terms of age, gender, type of cancer, and residential areas of the patient. We observed that there were more females than men and that both sexes had more instances in 2024 than in 2023. We found significant demographic trends in both temporal and gender dimensions when we compared the distribution of age and gender between 2023 and 2024. 1,227 patients (711 females and 516 males) in 2023 and 1,261 patients (720 females and 541 males) in 2024 were enrolled in the study. In 2023 and 2024, female patients made up 57.9% and 57.1% of the cohort, respectively, compared to 42.1% and 42.9% of male patients. There was no significant difference in the gender distribution across years ($p = 0.643$), suggesting consistent gender proportions throughout the study period. The age distribution showed notable gender-specific trends. The 51–60 age group had the highest percentage of female patients (24.61% in 2023, 26.94% in 2024), followed by the 41–50 age group (21.66% in 2023, 22.36% in 2024). Male patients were more prevalent in later age groups, especially the 61-70 and 71-80 groups, but they showed a similar tendency in the 51-60 age group (24.81% in 2023, 21.81% in 2024). The age-gender distribution between 2023 and 2024 revealed a non-significant difference ($p = 0.282$) at the $\alpha = 0.05$ significance level. This suggests that there was no statistically significant difference in the interaction between the distribution of age and gender between the two years.

Several patterns are worth mentioning even though they are not statistically significant. In 2024, both genders' representation in the 21–30 age range increased, especially for men (from 3.49% to 6.28%). On the other hand, the 11–20 age group showed a decline in representation, particularly among females (from 3.23% to 1.25%). There were only slight variations between years in the representation of the oldest age group (101–110), as shown in Table 1 and 2 and Picture 1. Significant differences in patient demographics between 2023 and 2024 were found in the geographical distribution study across districts in Table 3. Al-Najaf district Certain Najaf neighborhoods continuously accounted for the highest percentage of patients, making up 51.91% (n=637) in 2023 and 52.90% (n=667) in 2024 of the overall patient population. With contributions of 21.36% (n=262) in 2023 and 21.97% (n=277) in 2024, Al-Kufa district came in second.

With female patients making up 57.9% of the entire cohort in 2023 and 57.1% in 2024, gender distribution trends across districts were remarkably consistent. At the $\alpha = 0.05$ significance level, the district, gender, and year relationship showed a statistically significant variation in geographical distribution ($p = 0.042$). While patient proportions remained steady in the majority of districts, there were several locations that showed discernible shifts. Patient representation somewhat increased in the districts of Al-Manadira and Al-Moshkhab, but slightly decreased in Al-Hera and Al-Qadisea.

The investigation of cancer diagnostic patterns between 2023 and 2024 revealed considerable distribution variations across gender-specific categories, as shown in Table 4 and 5. There were significant changes in the frequency and ranking of the most common diagnoses. Breast cancer continued to be the most common diagnosis among female patients, rising from 41.35% (n=294) in 2023 to 41.25% (n=297) in 2024. Malignancies of the thyroid gland increased significantly, from 2.53% to 5.42% (n=18 to n=39). In a similar vein, ovarian cancer continued to be significantly represented (5.77% in 2023, 5.00% in 2024). But whereas NHL rose from 1.69% to 1.94% (n=12 to n=14), cervical cancer fell from 2.39% to 1.39% (n=17 to n=10). Prostate cancer became the most common diagnosis among male patients, rising from 7.75% (n=40) to 11.09% (n=60). Lung cancer consistently ranked as the second most prevalent cancer (12.60% in 2023, 13.86% in 2024). While ALL dropped from 1.55% to 1.11% (n=8 to n=6), bladder cancer showed a significant increase from 11.43% to 8.50% (n=59 to n=46). The

distribution of diagnoses varies statistically significantly between years (p = 0.043) at $\alpha = 0.05$. We highlighted in this section on significant shifts in the prevalence of cancer patterns, and we noticed on the increasing frequency of thyroid cancers in women and prostate cancer in men. The remaining species were steady over the course of the two years and made up a modest portion of the total.

Table 1: Age Distribution

Age Grube	**Repetition**				
	2023	**2024**	**2023**	**2024**	
1_10	26	22	2.12%	1.74%	P-value** 0.185**
11_20	46	26	3.75%	2.06%	
21_30	51	72	4.16%	5.71%	$\alpha = 0.05$
31_40	116	126	9.45%	9.99%	
41_50	222	210	18.09%	16.65%	P >0.05
51_60	303	312	24.69%	24.74%	
61_70	243	260	19.80%	20.62%	
61_70	162	172	13.20%	13.64%	
81_90	45	42	3.67%	3.33%	
91_100	12	16	0.98%	1.27%	
101-110	1	3	0.08%	0.24%	
Total	**1227**	**1261**	**100%**	**100%**	

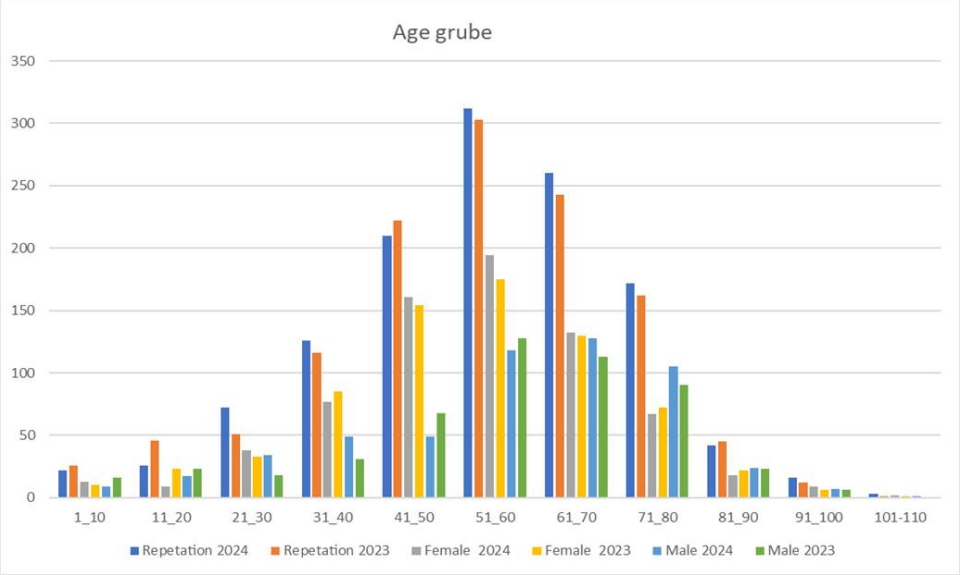

Figure 1: Age Grube Distribution Between the Two Years

Table 2: Age Distribution with Gender

Age Grube	**Male**		**Female**		**Male**		**Female**		
	2023	2024	2023	2024	2023	2024	2023	2024	
1_10	16	9	10	13	3.10%	1.66%	1.41%	1.81%	
11_20	23	17	23	9	4.46%	3.14%	3.23%	1.25%	
21_30	18	34	33	38	3.49%	6.28%	4.64%	5.28%	
31_40	31	49	85	77	6.01%	9.06%	11.95%	10.69%	
41_50	68	49	154	161	13.18%	9.06%	21.66%	22.36%	p = 0.643
51_60	128	118	175	194	24.81%	21.81%	24.61%	26.94%	
61_70	113	128	130	132	21.90%	23.66%	18.28%	18.33%	$\alpha = 0.05$
71_80	90	105	72	67	17.44%	19.41%	10.13%	9.31%	
81_90	23	24	22	18	4.46%	4.44%	3.09%	2.50%	P >0.05
91_100	6	7	6	9	1.16%	1.29%	0.84%	1.25%	
101-110	0	1	1	2	0%	0.18%	0.14%	0.28%	
Total	**516**	**541**	**711**	**720**	**100%**	**100%**	**100%**	**100%**	

Table 3: Distribution of Case in District

District	Female		Male		Female		Male		
	2023	2024	2023	2024	2023	2024	2023	2024	
Abosokhair	1	2	1	3	0.08%	0.16%	0.08%	0.24%	
Alabasia	35	35	27	28	2.85%	2.78%	2.20%	2.22%	
Alhaydarea	15	15	14	17	1.22%	1.19%	1.14%	1.35%	
Alhera	22	11	18	17	1.79%	0.87%	1.47%	1.35%	
Alhoria	11	11	9	9	0.90%	0.87%	0.73%	0.71%	
Alkufa	144	161	118	116	11.74%	12.77%	9.62%	9.20%	
Almadena city	1	2			0.08%	0.16%	0%	0%	
Almanadira	32	39	24	27	2.61%	3.09%	1.96%	2.14%	
Almoshkhab	42	41	29	30	3.42%	3.25%	2.36%	2.38%	
Alnajaf	389	388	248	279	31.70%	30.77%	20.21%	22.13%	p = 0.042
Alqadisea	14	13	15	10	1.14%	1.03%	1.22%	0.79%	
Alradawea	1	2	9	5	0.08%	0.16%	0.73%	0.40%	$\alpha = 0.05$
Albarakiea			1		0%	0%	0.08%	0%	P <0.05
Aljadida			1		0%	0%	0.08%	0%	
Alnidaa	1				0.08%	0%	0%	0%	
Khanalnus	1				0.08%	0%	0%	0%	
Khanalruboue			1		0%	0%	0.08%	0%	
Madlom	2				0.16%	0%	0%	0%	

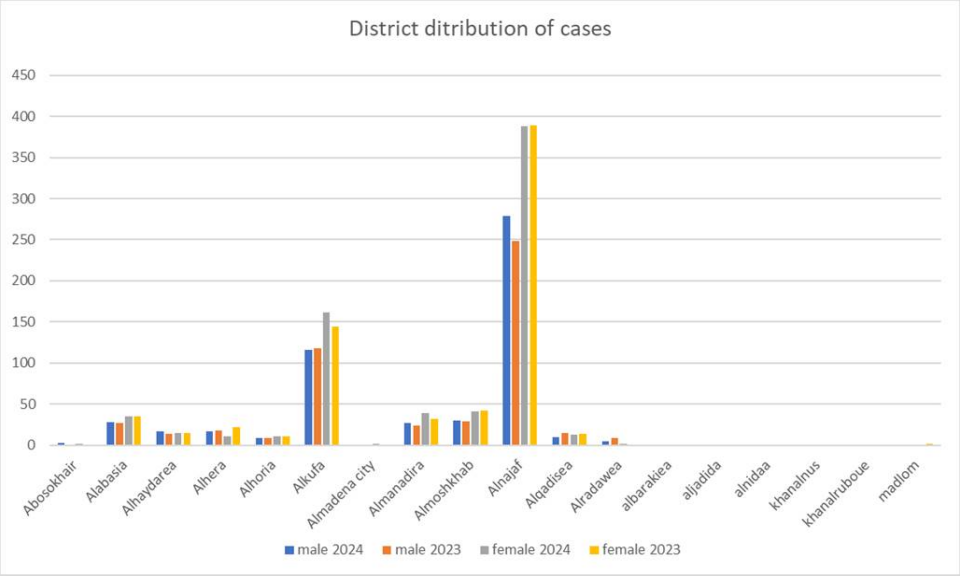

Figure 2: District Distribution of Cases

Table 4: Cancer Diagnosis Frequency by Gender and Year (2023)

2023					
Diagnosis	**Male**		**Diagnosis**	**Female**	
Lung	65	5.30%	Breast	294	23.96%
Bladder	59	4.81%	Ovary	41	3.34%
Prostate	40	3.26%	Lung	28	2.28%
Colon	31	2.53%	Stomach	24	1.96%
Brain	23	1.87%	H. L	23	1.87%
Pancreas	21	1.71%	Brain	22	1.79%
Kidney	19	1.55%	Colon	22	1.79%
Unknown primary	15	1.22%	Thyroid gland	18	1.47%
H.L	16	1.30%	Cervix	17	1.39%
Rectum	15	1.22%	Endometrium	16	1.30%
CLL	14	1.14%	Pancreas	15	1.22%
NHL	14	1.14%	Unknown primary	16	1.30%
Stomach	14	1.14%	Bladder	12	0.98%
Larynx	13	1.06%	kidney	12	0.98%
AML	9	0.73%	NHL	12	0.98%

Table 4 Continues

		2023				
Diagnosis	**Male**		**Diagnosis**	**Female**		
ALL	8	0.65%	ALL	9	0.73%	
Liver	8	0.65%	AML	9	0.73%	P)=0.043)
M.M	8	0.65%	Rectum	9	0.73%	
AL	7	0.57%	CLL	8	0.65%	
Breast	6	0.49%	AL	7	0.57%	α=0.05.
CML	6	0.49%	CML	7	0.57%	
Rectosigmoid	6	0.49%	Uterus	6	0.49%	
Testis	6	0.49%	Soft tissue sarcoma	6	0.49%	
Thyroid gland	6	0.49%	Liver	5	0.41%	
BCC of skin	5	0.41%	BCC of skin	4	0.33%	
Malignant melanoma	5	0.41%	B-cell Lymphoma	4	0.33%	
Nasopharynx	5	0.41%	M.M	4	0.33%	
SCC of skin	5	0.41%	Parotid gland	4	0.33%	
Cholangiocarcinoma	3	0.24%	SCC of skin	4	0.33%	
Esophagus	3	0.24%	Appendix	3	0.24%	
Gallbladder	3	0.24%	Chondrosarcoma	3	0.24%	
Seminoma	3	0.24%	Cholangiocarcinoma	2	0.16%	
Liposarcoma	3	0.24%	Esophagus	2	0.16%	
Adenoid cystic carcinoma	2	0.16%	Meningioma	2	0.16%	
B-cell lymphoma	2	0.16%	Metastatic endometrium	2	0.16%	
Eye	2	0.16%	Nasopharynx	2	0.16%	
Follicular lymphoma	2	0.16%	Oral cavity	2	0.16%	
Sweat gland	2	0.16%	STUMP	2	0.16%	
T-cell lymphoma	2	0.16%	T-cell lymphoma	2	0.16%	
Tongue	2	0.16%	Wilm's tumor	2	0.16%	
Ewing sarcoma	2	0.16%	Leiomyosarcoma of uterus	2	0.16%	
Osteosarcoma	2	0.16%	Synovial sarcoma	2	0.16%	
Soft tissue sarcoma	2	0.16%	Adrenal gland	1	0.08%	
Anal canal	1	0.08%	Bone	1	0.08%	
Appendix	1	0.08%	Choriocarcinoma	1	0.08%	
Benign pituitary adenoma	1	0.08%	Gallbladder	1	0.08%	
Burkitt's lymphoma	1	0.08%	GIST	1	0.08%	
Chondrosarcoma	1	0.08%	Hypopharynx	1	0.08%	
Ependymoma	1	0.08%	Jejunum	1	0.08%	
GIST	1	0.08%	Maxillary sinus	1	0.08%	
Hairy cell leukemia	1	0.08%	Metastatic NET of liver	1	0.08%	
Hepatoblastoma	1	0.08%	MZL	1	0.08%	
Klatskin	1	0.08%	NET of liver	1	0.08%	
Lymphoblastic lymphoma	1	0.08%	NMZL	1	0.08%	
Malignant lymphoma	1	0.08%	Rectosigmoid	1	0.08%	
Meningioma	1	0.08%	Retinoblastoma	1	0.08%	
Mycosis fungoides	1	0.08%	Secondary NET	1	0.08%	
Myxopapillary ependymoma	1	0.08%	Sezary syndrome	1	0.08%	
NET of liver	1	0.08%	Skin	1	0.08%	
Neuroblastoma	1	0.08%	Sinonasal sinus	1	0.08%	
Palate	1	0.08%	Spinal cord	1	0.08%	
Parotid gland	1	0.08%	Tongue	1	0.08%	
Pharynx unspecified	1	0.08%	Vulva	1	0.08%	
Plasmacytoma	1	0.08%	Leiomyosarcoma	1	0.08%	
pyriform sinus	1	0.08%	Liposarcoma	1	0.08%	
Retinoblastoma	1	0.08%	Myxofibrosarcoma	1	0.08%	
Salivary gland	1	0.08%	Pleomorphic sarcoma	1	0.08%	
Retinoblastoma	1	0.08%	Pleomorphic sarcoma	1	0.08%	
Skin	1	0.08%			0.00%	
Small intestine	1	0.08%			0.00%	
Thymoma	1	0.08%			0.00%	
Vocal cord	1	0.08%			0.00%	
Wilm's tumor	1	0.08%			0.00%	
Leiomyosarcoma	1	0.08%			0.00%	
Metastatic synovial sarcoma	1	0.08%			0.00%	
Rhabdomyosarcoma	1	0.08%			0.00%	

Table 5: Cancer Diagnosis Frequency by Gender and Year (2024)

2024						
Diagnosis	**Male**		**Diagnosis**	**Female**		
Lung	75	5.95%	Breast	297	23.55%	
Prostate	60	4.76%	Thyroidgland	39	3.09%	
Bladder	46	3.65%	Ovary	36	2.85%	
Colon	33	2.62%	Lung	27	2.14%	
Brain	31	2.46%	Rectum	26	2.06%	
NHL	27	2.14%	Pancreas	24	1.90%	
Kidney	24	1.90%	Brain	23	1.82%	
Pancreas	20	1.59%	Endometrium	19	1.51%	
Liver	18	1.43%	Colon	17	1.35%	
Stomach	17	1.35%	Bladder	14	1.11%	
Rectum	13	1.03%	NHL	14	1.11%	
H.L	11	0.87%	Unknown primary	13	1.03%	
AML	10	0.79%	Uterus	13	1.03%	
Breast	10	0.79%	CLL	12	0.95%	
CLL	10	0.79%	Stomach	12	0.95%	
Thyroid gland	10	0.79%	Cervix	10	0.79%	
Nasopharynx	8	0.63%	Liver	10	0.79%	P = (0.043)
Seminoma	8	0.63%	AML	8	0.63%	
Unknown primary	8	0.63%	H.L	8	0.63%	
AL	7	0.56%	Larynax	8	0.63%	α = 0.05.
CML	7	0.56%	ALL	7	0.56%	
Larynx	7	0.56%	Gallbladder	7	0.56%	
M.M	7	0.56%	CML	6	0.48%	
Testis	7	0.56%	AL	5	0.40%	
ALL	6	0.48%	Appendix	5	0.40%	
Softtissuesarcoma	5	0.40%	M.M	5	0.40%	
BCC Of Skin	3	0.24%	Ependymoma	4	0.32%	
Mesothelioma	3	0.24%	Nasopharynx	4	0.32%	
Osteosarcoma	3	0.24%	Softtissuesarcoma	4	0.32%	
T-cell lymphoma	3	0.24%	B-celllymphoma	3	0.24%	
Tongue	3	0.24%	Kidney	3	0.24%	
B-cell lymphoma	2	0.16%	Leiomyosarcoma	3	0.24%	
Esophagus	2	0.16%	Plasmacytoma	3	0.24%	
HCC	2	0.16%	Tongue	3	0.24%	
Malignantmelanoma	2	0.16%	Ampulla of vater	2	0.16%	
Oralcavity	2	0.16%	Esophagus	2	0.16%	
SCCofskin	2	0.16%	GIST	2	0.16%	
Analcanal	1	0.08%	Liposarcoma	2	0.16%	
Appendix	1	0.08%	MZL	2	0.16%	
Cholangiocarcinoma	1	0.08%	Oralcavity	2	0.16%	
Enchondroma	1	0.08%	SCCofskin	2	0.16%	
Ependymoma	1	0.08%	T-celllymphoma	2	0.16%	
Fibrosarcoma	1	0.08%	Adenoidcysticcarcinoma	1	0.08%	
Follicularlymphoma	1	0.08%	BCC Of Skin	1	0.08%	
GIST	1	0.08%	Bronchus	1	0.08%	
Hairycellleukemia	1	0.08%	Dermatofibrosarcoma	1	0.08%	
Hypopharynx	1	0.08%	Desmoidtumor	1	0.08%	
Knee	1	0.08%	HCC	1	0.08%	
Langerhans cell histiocytosis	1	0.08%	Malignantmelanoma	1	0.08%	
Lympho plasmacytic Iymphoma	1	0.08%	Osteosarcoma	1	0.08%	
Maxillary sinus	1	0.08%	Pancytopenia	1	0.08%	
MCL	1	0.08%	Parotidgland	1	0.08%	
Mycosisfungoides	1	0.08%	Rhabdomyosarcoma	1	0.08%	
Myxoidliposarcoma	1	0.08%	Skin	1	0.08%	
Parotidgland	1	0.08%	Sweatgland	1	0.08%	
Plasmacytoma	1	0.08%	Thymus	1	0.08%	
Pleomorpnicsarcom	1	0.08%			0%	
Renalpelivs	1	0.08%			0%	
Rhabdomyosarcoma	1	0.08%			0%	
Smallintestine	1	0.08%			0%	
Spinalcord	1	0.08%			0%	
Thymus	1	0.08%			0%	
Urethra	1	0.08%			0%	

4. Discussion

This study aimed to compare the distribution and patterns of cancer types recorded in Najaf between 2023 and 2024. The findings revealed the presence of 76 cancer types over a 24-month period, which represents a concerning public health indicator. Increasing cancer incidence has been reported in several national studies in Iraq, where researchers indicated that cancer rates have risen over time due to demographic changes, environmental exposure, and behavioral risk factors [5].

Local cancer statistics show that the incidence of many types of cancer has increased significantly in Iraq over the past two decades. For example, the cancer incidence rate increased from 43.95 per 100,000 in 1999 to more than 91 per 100,000 in 2019 in 2019, indicating an upward trend in the cancer burden in the country (Iraqi Cancer Registry data analysis).

Regarding age distribution, our research results showed that the highest incidence was recorded in the 51-60 age group, particularly among females. This is almost identical to epidemiological studies conducted in Iraq, which found that the incidence rate gradually increases with age, peaking in the elderly and middle-aged. In an epidemiological study conducted in Basra, females constituted 59% of cancer cases, and the average age was approximately 51 [6].

Our study results also showed that the incidence of breast cancer increased significantly, especially among women aged 40 to 59, which is consistent with the age groups identified in [7] study. Also, research conducted in Najaf recorded that breast cancer remains the most common type of cancer among women in the region, and that the disease is closely related to age, hormonal factors, and family history [8, 9].

In addition, several local studies were conducted in Najaf hospitals looking into the biological and clinical characteristics of breast cancer patients, and confirmed the high prevalence of this disease among women in the province. For instance, a recent clinical study in Najaf evaluated biomarkers associated with breast cancer and emphasized the importance of early detection and diagnosis in improving patient outcomes [10].

Our observation of the predominance of females in cancer cases (approximately 57% in both years) is consistent with the results of another study which reported that breast cancer was the most common type of cancer among women in Najaf, accounting for more than 40% of breast cancer cases among females cases Statistics at a glance (2022).

We observed that the neighborhoods in Najaf with the highest recorded rates of cancer were in the Najaf district, which includes several neighborhoods, including Al-Ghadir and Al-Furat. Our results are consistent with [11] studies which found strong spatial clusters of breast cancer in urban areas such as Al-Ghadir and Al-Furat.

Our spatial analysis showing Al-Najaf and Al-Kufa as the most affected districts aligns with previous research. A 2023 study from the Oncology Educational Center in Najaf found that urban areas had significantly higher cancer incidence than rural ones, likely due to population density, pollution, and better access to diagnostic services [11]. The statistically significant change in district-level distribution ($p = 0.042$) in our study mirrors findings from kernel density estimation models used in prior research to identify cancer hotspots in Najaf Statistics at a glance (2022).

Environmental and regional differences may also influence cancer prevalence. Studies conducted in various Iraqi regions have shown that cancer patterns vary geographically, often being higher in urban areas where environmental pollution, lifestyle changes, and access to healthcare differ from those in rural areas.

The increase in cases of certain cancers, such as thyroid and breast cancer, observed in our study may reflect global trends related to improved diagnostic techniques, screening programs, and increased health awareness. Previous studies examining breast cancer incidence trends in Iraq have confirmed a steady rise in the incidence rate over the past two decades [7, 12].

Our data, which showed breast cancer as the most common cancer among women and prostate cancer among men, are consistent with GLOBOCAN statistics for Iraq, which ranked these two cancers among the top five most common cancers nationwide. The high incidence of malignant thyroid tumors among women and prostate cancer among men in our data is noteworthy. Nabhan [13] has confirmed the global increase in thyroid cancer diagnoses, often attributed to improved screening methods and environmental factors.

The diagnosis distribution ($p = 0.043$) in our study supports the notion that cancer patterns are evolving. This is echoed in the Re-evaluation of Cancer Incidence for Gender in Iraq study, which found shifting trends in cancer types over the past decade, especially in urban centers [14].

Article Information

Acknowledgments: The authors thank the Staff of the Statistics Department at the National Hospital for Oncology and Hematology in Najaf.

Author Contributions: Fadak Mansour Abd El Redha - Conceptualization, Data curation, Writing – review & editing; Ghadeer Mohammed Hussain - Methodology, Formal analysis, Writing – original draft, Supervision.

Funding / Financial Support: The authors received no external funding.

Conflict of Interest: The authors declare no competing interests.

Data Availability Statement: Data available on reasonable request.

Disclaimer (Artificial Intelligence): The author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.), and text-to-image generators have been used during writing or editing of manuscripts.

References

[1] A. H. T. Waly and A. H. Barraj. Prostate Cancer in Iraq: A Comprehensive Literature Review of Epidemiology, Clinical Landscape, Challenges, and Public Health Strategies. *Asian Pacific Journal of Cancer Care*, 10(3):871–880, 2025.

[2] D. R. A. Al-janabi, Y. A. Shallani, L. A. D. Albakaa, and A. A. J. Aljanaby. Prevalence of types of cancer in Najaf Governorate and comparison of leukemia with other types. *Journal of Biomedicine and Biosensors*, 4(2):1–10, 2024.

[3] J. G. Olaogun, J. A. Omotayo, J. T. Ige, A. E. Omonisi, O. O. Akute, and O. S. Aduayi. Socio-demographic, pattern of presentation and management outcome of breast cancer in a semi-urban tertiary health institution. *Pan Afr. Med. J.*, 36(1), 2020.

[4] Hadi Hasan Hadi, Ali Kadhim Hussein, Wurood Hasan Hadi, and Faten Ali Abd Alzahra Albarki. Assessment of cancer clusters in the Najaf, 2020 to 2023: A geographic analysis. *International journal of physis and application*, 7(1), 2025. Part C.

[5] H. H. Salih, S. Y. Abd, E. Al-Kaseer, and J. Al-Diwan. Cancer in Iraq, General View of Annual Report 2022. *Journal of Contemporary Medical Sciences*, 10(6), 2024.

[6] R. A. Abood, K. A. Abdahmed, and S. S. Mazyed. Epidemiology of different types of cancers reported in Basra, Iraq. *Sultan Qaboos University Medical Journal*, 20(3):e295, 2020.

[7] M. M. Y. Al-Hashimi. Trends in Breast Cancer Incidence in Iraq During the Period 2000-2019. *Asian Pac J Cancer Prev*, 22(12): 3889–3896, December 2021. doi: 10.31557/APJCP.2021.22.12.3889. PMID: 34967568. PMCID: PMC9080353.

[8] H. Khalaf, A. Mohammed, S. Shukur, N. Alhalabi, B. Almothafar, M. Hassan, and A. Abu. Breast cancer: age incidence, hormone receptor status and family history in Najaf, Iraq. *J Med Life*, 15(10):1318–1321, October 2022. doi: 10.25122/jml-2022-0296. PMID: 36420288. PMCID: PMC9675305.

[9] N. Aljubori. Breast cancer in Iraq. *International Journal of Medical Sciences*, 1(1):6–12, 2018.

[10] A. N. Abbas and W. S. Hamid. Assessment of Interleukin-19 Level and Factors Associated with Breast Cancer for A Sample of Al-Najaf Women, Iraq. *Medical Science Journal for Advance Research*, 5(3), 2024.

[11] D. R. A. Al-janabi, Y. A. Shallani, L. A. D. Albakaa, and A. A. J. Aljanaby. Prevalence of types of cancer in Najaf Governorate and comparison of leukemia with other types. *Journal of Biomedicine and Biosensors*, 4(2):1–10, 2024.

[12] M. M. Al-Hashimi and X. J. Wang. Breast cancer in Iraq, incidence trends from 2000-2009. *Asian Pac J Cancer Prev*, 15(1):281–286, 2014. doi: 10.7314/apjcp.2014.15.1.281. PMID: 24528040.

[13] F. Nabhan, P. H. Dedhia, and M. D. Ringel. Thyroid cancer, recent advances in diagnosis and therapy. *International journal of cancer*, 149(5):984–992, 2021.

[14] N. A. Mahmood and N. A. Thamer. Re-evaluation of cancer incidence for gender in Genetics Iraq. *Iraqi Journal of Cancer and Medical Genetics*, 12(1):13–20, 2019.