MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 36 Issue 1s, 2026, Pages: 758-761

Spatial distribution of cancer patients in Dhi Qar Governorate

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Abstract
The spatial distribution of cancer patients in Dhi Qar Governorate takes on varying and fluctuating patterns from one period to another. It began to increase after the second war on Iraq in 2003, which witnessed a significant rise in the study area during the period (2013-2023). This was accompanied by a rise in the rate of environmental pollution and a decline in health services at all levels. The study area suffers from a lack of services and centers dedicated to cancer tumors. The number of cases increased during the study period, reaching (7017) cases distributed across the districts of Dhi Qar Governorate. There are common diseases, most notably breast cancer, which reached (707) cases. There are less common cases, most notably thyroid cancer, which reached a total of (401) cases. Most cancer cases were concentrated in the city of Nasiriyah. The research study showed that the increase in cases was due to internal factors and increased environmental pollution in the study area.
Keywords: distribution, injuries, cancer, Dhi Qar.
Introduction: Cancer is one of the most prominent contemporary challenges with intertwined economic, demographic, and social effects. Cancer ranks second as a cause of death after heart disease. Cancer begins with small growth within the body's cells, which then grows into a large mass and transforms into a cancerous tumor. This study aims to identify the spatial distribution of cancer patients in Dhi Qar Governorate and to uncover the underlying environmental phenomena that have led to the spread and worsening of the disease in recent years in Dhi Qar Governorate and the increasing incidence of cancerous tumors in the governorate. Dhi Qar Governorate is one of the southern regions of Iraq where cancer has spread and its severity has increased in recent years, which necessitates a study to diagnose the spread of the disease.
A- Research problem: The research problem is the first step in scientific research, and the research problem came about to identify the most dangerous pathological phenomena. Therefore, the research problem can be formulated as (What is the reality of the spatial distribution of those infected with cancerous diseases in Dhi Qar Governorate?).
2 - Research hypothesis: The research hypothesis can be formulated as follows:
The spatial distribution of cancer patients in Dhi Qar Governorate varies, as do the appearance of cancerous tumors and the rate of their spread.
3 - Importance of the research: The importance of the research lies in knowing the total number of people with cancer in Dhi Qar Governorate during the period (2013-2023), and in raising awareness of the seriousness of cancer and the increasing types of cancer in Dhi Qar Governorate.
4 – Research objective: The research aims to reveal the increasing rate of cancer cases and to identify the spatial patterns of those with the most prevalent cancerous tumors in Dhi Qar Governorate.
5 – Spatial and temporal boundaries of the research: The spatial boundaries of Dhi Qar Governorate, located in the southern part of Iraq, extend between latitudes (30,26-32,0) north and longitudes (45,39-47,10) east. It is bordered to the north by Wasit Governorate, to the northeast by Maysan Governorate, to the south and southeast by Basra Governorate, to the west and southwest by Muthanna Governorate, and to the northwest by Qadisiyah Governorate. Note that Map (1) represents the location of Dhi Qar Governorate in Iraq.
Time limits: The time limits were represented by the period from (2013-2023).
6 – Research terms and concepts:
1- Health:health
Health means the activity aimed at sustaining human life and protecting it from diseases and epidemics. Health has been defined by the World Health Organization (WHO) as follows:(who) that it is the actual normal social condition that guarantees improved global health, advanced treatment, i.e., immunity against diseases (Ali, 2009, p. 25).
2 -**Immunity**
The body's ability to resist and overcome various diseases that affect the body of a living organism from chemical, biological, physical pollutants and radiation.
3 -carcinogens
Changes in the composition of the genetic material present in the cell nucleus and the occurrence of malignant cancerous tumors, and it has a role in the development of cancer when exposed to it continuously, such as heavy metals, growth hormones and chemicals (Tawfiq, 1990, p. 36).
4 - Depleted uranium
Uranium contains a highly toxic radioactive element with a density of (19) g/cm2. It has two forms called isotopes, which cause cancerous tumors and leave negative effects on the health of the Iraqi environment.
5 –Aflatoxins
These are toxic substances produced by some fungi and molds through their growth on stored materials in humid conditions. The toxins affect the human liver, bladder, and thyroid gland and cause cancerous tumors.
6 – Viruses:
Viruses are non-living organisms that cannot live and reproduce on their own. They need the cells of a living organism, and these viruses contribute to the emergence of many types of cancer, including liver, cervical, lung, and other cancers.
7 –pathological
It consists of germs and parasites that lead to tissue changes and their transformation into atrophy and inflammation, which makes them predisposed to developing cancerous tumors (Al-Dulaimi, 2009, p. 315).
Spatial distribution of cancer patients in Dhi Qar Governorate
Studying the spatial distribution of cancer patients in Dhi Qar Governorate reveals the spatial reality of the patients and the extent of its spread in the governorate. The study area is affected by several factors that contributed to the spread of cancer, including environmental pollution, which had the greatest impact on the spread of cancer, and the wars that Iraq went through, including the Iran-Iraq War and the use of heavy weapons, cluster bombs, and missiles containing radioactive phosphorus and uranium. The economic embargo also played a prominent role in the shortage of health services and other services. In addition, the events of the 2003 war led to an increase in the number of cancer cases. Dhi Qar Governorate recorded a large number of cancer cases during the study period, amounting to 7017 types of cancer distributed across the districts of Nasiriyah. Nasiriyah district recorded the highest percentage of cases, recording about (2937) cases, representing 41.85%, as shown in Table (1) and Map (2). It was followed by Al-Rifai district, which recorded about (1578) cases, representing 22.48%. Al-Shatra district came in third place, recording (1052) cases, representing 14.99%. Suq Al-Shuyukh district came in fourth place, recording (749) cases, representing 10.67%. Al-Jubayish district came in last place, recording (701) cases, representing 9.99%.
Table (1) Spatial distribution of cancer patients in the districts of Dhi Qar Governorate for the period (2013-2023)

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%	number	judiciary
41.85	2937	Nasiriyah
22.48	1578	Al-Rifai
14.99	1052	Al-Shatra
10.67	749	Sheikhs Market
9.99	701	Al-Jubayish
100	7017	the total

Source: Based on:
1 - Dhi Qar Health Department, Al-Haboubi Hospital, Cancer Disease Control Unit, Unpublished Data.
2 - Dhi Qar Health Department, Cancer Tumors Division, Unpublished Data for the Years (2013-2023).
3 - Dhi Qar Health Department, Statistics Division, Unpublished Data.

Table (2) Spatial distribution of cancer patients in Dhi Qar Governorate (2013-2023)

womb		**leather**		**bones**		**lung**		**blood**		**the breast**		**judiciary**
%	number	%	number	%	number	%	number	%	number	%	number	
63.36	346	43.37	239	52	325	37,34	245	39.20	258	49.50	350	**Nasiriyah**
8.79	48	14,15	78	18.8	118	32.16	211	20.51	135	17.7	98	**Al-Rifai**
9.52	52	9.80	54	10.4	65	5.94	39	14,13	93	9.0	50	**Sheikhs Market**
12,27	67	28.13	155	13.0	19	10.0	66	22,34	147	36.29	200	**Al-Shatra**
6.0	33	4,531	25	15.68	98	14.48	95	3.20	25	1.6	9	**Al-Jubayish**
100	546	100	551	100	625	100	656	100	658	100	707	**the total**

Source: Based on:
1 - Dhi Qar Health Department, Al-Haboubi Hospital, Cancer Disease Control Unit, Unpublished Data.
2 - Dhi Qar Health Department, Cancer Tumors Division, Unpublished Data for the Years (2013-2023).
3 - Dhi Qar Health Department, Statistics Division, Unpublished Data.

Table (3) Spatial distribution of cancer patients (bladder, brain, colon, lymphatic, prostate, liver, thyroid) in Dhi Qar Governorate (2013-2023)

thyroid		**liver**		**prostate**		**lymphatic**		**Colon**		**brain**		**bladder**		**judiciary**
%	number	%	number	%	number	%	number	%	number	%	number	%	number	
28.6	115	51.46	211	30.73	134	35,123	163	24.70	126	37.6	198	43.0	227	**Nasiriyah**
24.93	100	23.17	95	28.66	125	22.62	105	15.68	80	43.72	230	29.41	155	**Al-Rifai**
7.48	30	11,21	46	11.92	52	21.12	98	14.50	74	6.84	36	11,38	60	**Sheikhs Market**
17.45	70	5.85	24	9.17	40	12.0	56	23.52	120	4.18	40	9.10	48	**Al-Shatra**
21.44	86	8.29	34	19.49	85	9.0	42	21,56	110	4.18	22	7.0	37	**Al-Jubayish**
100	401	100	410	100	436	100	464	100	510	100	526	100	527	**the total**

Source: Based on:
1 - Dhi Qar Health Department, Al-Haboubi Hospital, Cancer Disease Control Unit, Unpublished Data.
2 - Dhi Qar Health Department, Cancer Tumors Division, Unpublished Data for the Years (2013-2023).
3 - Dhi Qar Health Department, Statistics Division, Unpublished Data.

1 - Spatial distribution of breast cancer patients for the period (2013-2023)

Breast cancer is the most common and widespread type of cancer in the study area, ranking first among cancer cases in Iraq in general and in Dhi Qar Governorate in particular. The incidence of breast cancer is continuously rising. Table (2) shows that the incidence of breast cancer in the Nasiriyah district center reached (350) cases, representing (45.50%), with Nasiriyah district recording the highest number of cases. It is followed by Al-Shatra district in second place with (200) cases, representing (36.29%), then Al-Rifai district in third place with (98) cases, representing (17.7%), Suq Al-Shuyukh district with (50) cases, representing (9.0%), and finally Al-Jubayish district with (9) cases, representing (1.6%). The reason for breast cancer cases is attributed to population growth, which leads to an increase in solid and liquid waste polluting the environment (Al-Ulayawi, 2010, p. 44), and changes in lifestyles, including obesity and lack of physical activity. Delayed childbearing, lack of breastfeeding among those affected, exposure to chemicals, exposure to harmful radiation, increased sewage water, and some of these are genetic factors that lead to an increased risk of breast cancer due to genetic factors.

2 – Spatial distribution of leukemia patients

Leukemia is the most common type of cancer affecting humans, ranking second only to breast cancer in the study area. Table (2) shows a spatial variation in leukemia cases within the study area. Approximately (658) cases of leukemia were recorded, distributed across the districts of Dhi Qar Governorate. Nasiriyah District had the highest number of cases, recording approximately (258) cases, representing (39.20%). This was followed by Al-Rifai and Al-Shatra Districts, with (135,147) cases, representing approximately (20.51%) and (22.34%), respectively. This increase in leukemia cases is attributed to high population density, exposure to high levels of radiation (Karsou, 2013, p. 35), environmental pollution, water pollution, and waste burning. The lowest number of leukemia cases was recorded in Al-Jubayish and Suq Al-Shuyukh Districts, with (93,25) cases, representing (14.13%) and (3.79%), respectively, due to low registration rates. Weak health infrastructure and difficulty in accessing services

3 – Spatial distribution of lung cancer patients

Table (2) shows the variation in lung cancer cases in the study area, with Al-Nasiriyah district having the highest number of cases, recording (245) cases, representing (37.34%). It was followed by Al-Rifai district and Al-Jubayish district, with (211.95) cases, representing approximately (32.16%) and (14.48%). The reason for the high number of lung cancer cases is attributed to environmental and air pollution, fuel combustion (Al-Kaabi, 2013), in addition to war violations and the use of weapons containing uranium, and weak health awareness. Meanwhile, the lowest number of cases was recorded in Suq Al-Shuyukh and Al-Shatra districts, with (39.66) cases, representing (5.94%) and (10.0%).

4 – Spatial distribution of bone cancer patients

Table (2) shows that (625) cases were distributed across the districts of Dhi Qar Governorate, with Nasiriyah District leading with (325) cases and a percentage of (52%), followed by Al-Rifai and Al-Jubayish Districts with approximately (118.98) cases and percentages of approximately

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 36 Issue 1s, 2026, Pages: 758-761

(18.8%), 15.68%, and the reasons for this increase in cases are due to the effects of a group of human and natural factors, while the lowest cases were recorded in Suq Al-Shuyukh and Al-Shatra Districts with (65.19) cases and percentages of approximately (10.4%), 3.0%, and 10.4%, respectively.

5 – Spatial distribution of skin cancer patients

Regarding the distribution of skin cancer cases in Dhi Qar Governorate, which are present in all districts of the governorate, it is clear from observing Table (2) that the total number of registered skin cancer cases reached (551) cases, and Nasiriyah district topped the list with (239) cases and a percentage of (43.37%), followed by Al-Rifai and Al-Shatra districts with about (78,155) cases and percentages of (14.15%), 28.13%, and the reason is due to the presence of oil pollutants, exposure to ultraviolet radiation and sun exposure, lifestyle (Fathi, p. 32), and some of them are genetic factors, while the lowest cases were recorded in Suq Al-Shuyukh and Al-Jubayish districts with (54,25) cases and percentages of about (9.80%), 4.53%, due to the lack of registration and detection.

6 – Spatial distribution of women with uterine cancer

Uterine cancer is the most common cancer affecting females. Table (2) shows that the spatial distribution of uterine cancer cases in the study area is irregular. The total number of uterine cancer cases in the study area reached (546) cases, with Al-Nasiriyah district having the highest number of cases, with (346) cases, representing (63.36%), while the lowest number of uterine cancer cases were recorded in Al-Rifai, Suq Al-Shuyukh, Al-Shatra, and Al-Jubayish districts (48, 52, 67, 33) cases, representing approximately (8.79%), 9.52%, 12.27%, and 6.0%) respectively. This is attributed to the increase in pollutants in the city center, the adoption of some unhealthy lifestyles, the lack of health system infrastructure, and the delay in early detection of the disease.

7 – Spatial distribution of bladder cancer patients

Regarding the distribution of bladder cancer cases in Dhi Qar Governorate, it is present in all districts of the study area. From the data in Table (3), it is clear that the total number of cases is (527), with Al-Nasiriyah and Al-Rifai districts having the highest number of cases, with (227,155) cases and percentages of (43.0%, 29.41%), followed by Suq Al-Shuyukh, Al-Shatra, and Al-Jubayish districts, where cases were recorded with approximately (60, 48,37) cases and percentages of (11.38%, 9.10%, 7.0%). The reason for this is attributed to water pollution, smoking, in addition to exposure to chemical and industrial pollutants and other reasons mentioned previously.

8 – Spatial distribution of brain cancer patients

It is noted from the numerical data in Table (3) that the total number of people infected with brain cancer in the study area reached (526) cases, and the districts of Nasiriyah and Al-Rifai topped the list with (198,230) cases and percentages of approximately (37.6%, 43.72%), followed by the districts of Suq Al-Shuyukh, Al-Shatra and Al-Jubayish with (36, 40,22) cases and percentages of (6.84%, 7.60%, 4.18%). The reason for this is due to the results of the wars and the use of radioactive materials and weapons containing uranium. As for the districts that recorded the lowest cases, it is due to the lack of registration and early diagnosis.

9 – Spatial distribution of colon cancer patients

The numerical data in Table (3) shows that the spatial distribution of colon cancer in Dhi Qar Governorate is irregular, as the total number of cases in the study area reached (510) cases. The districts of Nasiriyah, Shatra and Al-Jubayish topped the list in terms of cases, reaching (126, 120, 110) cases, with percentages of approximately (24.70%), (23.52%), and (21.56%). They were followed by the districts of Al-Rifai and Suq Al-Shuyukh, with (80.74) cases, with percentages of (15.68%), (14.50%). The reason for the irregular distribution of cases in the study area is attributed to industrial waste, lack of physical activity and following an unhealthy dietary pattern. In addition, the reason is the genetic factor.

10 – Spatial distribution of patients with lymphoma

From observing Table (3), it is clear that the rates of lymphoma are high during the study period, as the number of cases reached (464) cases, as most of the cases were concentrated in the districts of Nasiriyah, Al-Rifai and Suq Al-Shuyukh with (163, 105, 98) cases and percentages of (35, 12%, 22, 62%, 21, 12%), followed by the districts of Al-Shatra and Al-Jubayish in second place with cases recorded (56, 42) cases and percentages of approximately (12, 0%, 9, 0%). The reason for this is due to the increase in environmental pollutants, the weakness of the immune system and the behavior of an unhealthy diet based on carcinogenic preservatives.

11- Spatial distribution of prostate cancer patients

Regarding the distribution of prostate cancer cases in Dhi Qar Governorate, which are present in all districts of the study area, the total number of people with prostate cancer reached (436) cases. From Table (3), we see that the districts of Nasiriyah and Al-Rifai came in first place with the highest percentage, with (134,125) cases and percentages of approximately (30.73%), 28.66%, and then they are followed by the districts of Al-Shatra, Suq Al-Shuyukh and Al-Jubayish in second place, where cases were recorded (52,4085) cases and percentages of (11.92%), 9.17%, 19.49%, and the reason for this is attributed to the lack of attention by patients to health guidelines for preventing the disease, and the reason is also the consumption of unhealthy foods.

12 – Spatial distribution of liver cancer patients

The spatial distribution of liver cancer patients varies significantly between districts of Dhi Qar Governorate. As shown in Table (3), the number of cases reached (410). Nasiriyah and Rifa'i districts came in first place with (211,95) cases, with percentages of (51.46%, 23.17%). This is attributed to unhealthy diets and physical and psychological stress. Then, Suq al-Shuyukh, Shatrah, and Al-Jubayish districts came in second place with approximately (46, 24,34) cases, with percentages of (11.21%, 5.85%, 8.29%). This is due to low registration and diagnosis and difficulty in accessing the health center.

13 – Spatial distribution of thyroid cancer patients

There is a clear variation in the spatial distribution of thyroid cancer patients in the study area. Table (3) shows that the number of cases reached about (401) cases. The districts of Nasiriyah and Al-Rifai ranked first in cases with (115,100) cases and percentages of about (28.6%), 24.93%. Then the districts of Al-Shatra and Al-Jubayish came in second place with (70,86) cases and percentages of (17.45%), 21.44%. The reason for this is attributed to the weakness of the immune system and the unhealthy dietary pattern. The district of Suq Al-Shuyukh recorded the lowest cases with (30) cases and a percentage of (7.48%), due to the lack of registration and early diagnosis.

It is evident that the spatial distribution of cancer patients takes a fluctuating and varied pattern in the study area, as a result of the high percentage of environmental pollutants, the low quality and lack of health services, and the absence of hospitals dedicated to cancer tumors, in addition to the increase in toxic air pollutants. Most of the mentioned cases were concentrated in the center of the governorate, and the reason for this is the increase in pollutants in the city center, the accumulation of liquid and solid waste, and industrial, medical and commercial activities, and some of the reasons are due to personal behavioral factors.

Conclusions

1 - The research results showed an increase in cancer cases in Dhi Qar Governorate during the period (2013-2023), reaching (7017) cases distributed across the districts of Dhi Qar Governorate.

2 - Breast cancer recorded the highest number of cases in the study area, with (707) cases.

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ISSN: 1053-7899
Vol. 36 Issue 1s, 2026, Pages: 758-761

3 - The highest rates of cancerous tumors were concentrated in the Nasiriyah district, linked to personal and behavioral factors and environmental pollution.
4 - The lack of cancer detection centers in Dhi Qar Governorate and the deterioration of the service situation.
5 - The geographical factor is involved in the type of cancerous tumors in Dhi Qar Governorate, including the environmental factor resulting from burning waste, brick factories, radioactively contaminated sites, and drinking water pollution.
6 - Cancer (liver, prostate, thyroid) recorded the lowest incidence of cancerous tumors in the study area.

Recommendations

1 - Raising awareness and providing guidance in all institutions, clarifying the risks that cause cancer.
2 - Relocating factories and brick plants away from residential areas due to the pollution they cause.
3 - Tightening control, enforcing environmental laws, and preserving work areas.
4 - Holding seminars and promoting media awareness of the dangers of cancer and limiting its spread.

References:

1 - Al-Dulaimi, Khalaf Hussein Ali, Geography of Health, 1st ed., Dar Al-Sana'a for Publishing and Distribution, Amman, 2009.
2 - Al-Omari, Muthanna Abdul-Razzaq, Environmental Pollution, 2nd ed., Dar Wael for Publishing and Distribution, Amman.
3 - Al-Ulayawi, Jinan Ismail Khalaf, Temporal and Spatial Dimensions of Cancer Diseases in Maysan Governorate 1997-2008, Master's Thesis, College of Arts, University of Basra, 2010.
4 - Al-Kaabi, Amal Sal and Shukri Ibrahim, The Spatial Pattern of Cancer Diseases in Basra Governorate (2001-2010), Basra Arts Journal, Issue 67, Special Proceedings of the Fifth Scientific Conference of the College of Arts 2013.
5 - Fathi, Masoud Hussein, The geographical distribution of cancer in the city of Al-Bayda and its surrounding areas (a study in medical geography), Master's thesis, Faculty of Arts, University of Benghazi.
6 - Karsou, Maryam Issa Hussein, Cancer in the Gaza Strip (A Study in Medical Geography), Master's Thesis, Faculty of Arts, Islamic University, 2013.
7 - Tawfiq, Hafiz Abd and Tariq Aqil Abd Yassin, Cancer and its Causes, Higher Education Press, Baghdad, 1990.
8 - Dhi Qar Health Department, Statistics Division, Unpublished Data.
9 - World Health Organization, Community Medicine 238.
10. Field study dated 22/4/2025.