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Hospital-Based Epidemiological Distribution of Lung and Liver Cancer Among Patients Attending the National Oncology and Hematology Center in Najaf, Iraq (2021–August 2026)

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Abstract. This study aims to describe the hospital–based epidemiological distribution of registered lung and liver cancer cases at the National Oncology and Hematology Center in Najaf, Iraq, from 2021 to August 2026. A retrospective hospital-based descriptive study was conducted using records of 1,470 patients aged 10 years and above who were diagnosed with lung or liver cancer. Data were summarized using frequencies and percentages, and Pearson's chi-square test was used to assess associations among cancer type, sex, and residential area. Lung cancer accounted for 1,232 cases (83.81%), whereas liver cancer accounted for 238 cases (16.19%). Males represented 995 cases (67.7%), and females 475 cases (32.3%). Patients aged 50 years and above accounted for 1,290 cases (87.8%), with the largest proportion in the 60–69-year group (29.32%). The highest number of registered cases was recorded in 2025 (311 cases); however, 2026 data covered only January through August and were therefore not directly comparable with complete calendar years. A statistically significant association was observed between cancer type and sex (χ^2=5.938, df=1, p=0.0148), with liver cancer constiuting a higher proprotion of cases among females (19.6%) than among males (14.6%), and between sex and residential area (χ^2=8.833, df=1, p=0.0030), whereas the association between cancer type and residential area was not statistically significant (χ^2=1.645, df=1, p=0.200). These findings describe the distribution of registered hospital cases and should not be interpreted as population-based disease rates. Population-based studies incorporating relevant risk factors and population denominators are needed to further investigate the epidemiology of lung and liver cancer in Najaf.
In conclusion, lung cancer constituted the largest proportion of registered cases, males accounted for a higher proportion than females, and most cases occurred among patients aged 50 years and above. The observed associations with sex and residential area should be interpreted within the hospital -based nature of the dataset. Further population -based research is needed to estimate disease rates and examine the contribution of smoking, viral hepatitis, environmental exposures, and access to healthcare.

Keywords: Lung cancer, liver cancer, sex and age differences, Najaf, Iraq.

1. Introduction

Unlike benign tumors, which generally do not invade surrounding tissues or spread to distant sites, cancer comprises a heterogeneous set of disorders in which abnormal cells multiply and expand without normal regulatory control. This disease remains a major global public health burden. Based on the most recent GLOBOCAN 2024 figures, nearly 20.6 million newly diagnosed cases and 9.8 million deaths attributable to cancer occurred across the globe during 2024 [1]. One of the most prevalent malignancies in developing nations is liver cancer, especially hepatocellular carcinoma (HCC). It is intimately linked to liver cirrhosis brought on by alcohol use or other long-term liver conditions, as well as long-standing infection with hepatitis B and C viruses (HBV/HCV). According to recent research conducted in the Middle East and North Africa (MENA), the burden of liver cancer is rising due to several variables, such as obesity, type 2 diabetes, and viral infection [2][3]. Globally, lung cancer ranks first in both the number of new diagnoses and

the number of cancer deaths [4]. Tobacco use is a primary causal determinant and causes about 80-90% of cases of lung cancer; there are also carcinogenic agents, such as radon and environmental pollutants, that contribute to the development [5][7][8]. Lung cancer is distinguished by its rapid spread to other organs, such as the brain and bones [6]. According to the latest GLOBOCAN 2024 estimates, Iraq recorded 34279 newly diagnosed cases and 19963 deaths due to the disease during that year. Lung cancer accounted for 2758 new cases (8.0%) and 2621 deaths (13.1%), ranking second among cancers in both incidence and mortality [11]. Nationally, it represents one of the commonest malignancies and a leading contributor to cancer mortality [9]. Given the high rate of smoking and the pervasiveness of chronic liver disorders, concentrating on liver and lung cancer in Iraq emphasizes the necessity of bolstering prevention and early detection initiatives. Research on these cancers also helps to develop effective governmental programs to reduce the burden of these diseases [10].

2. Research Methodology

A retrospective, hospital-based descriptive study was conducted to describe registered cases of lung and liver cancer from 2021 to August 2026. Information extracted from the records included cancer type, sex, age group, residential area, and year of diagnosis. Altogether,1470 registered records were included in the analysis. Frequencies along with percentages were used for summarizing the data. At the same time, Pearson's chi-square test was applied to examine the relationships of cancer type with residential area, cancer type and sex, and sex and residential area. Because the dataset consisted of hospital-registered cases and didn't include population denominators, the results were interpreted as distributions of registered cases rather than population-based disease rates.

2.1 Research Site and Data Source

The research took place at the National Oncology and Hematology Center in Al-Najaf Al-Ashraf Governorate, Iraq. Records from January 2021 through August 2026 were reviewed. Eligible cases comprised both male and female patients whose age was 10 years or more and who had been diagnosed with lung or liver cancer. Registered cases were from urban and rural areas and included patients residing inside and outside the governorate.

2.2 Data Analysis

Statistical processing was performed with SPSS software (version 26), and counts with their proportions were calculated for all categorical measures. Pearson's chi-square procedure was used to examine relationships among categorical factors, with statistical significance set at $p > 0.05$.

3. Results

Our results indicated (Table 1) that 1470 registered cases were recorded from 2021 to August 2026. Of these, 83.81% were lung cancer and 16.19% were liver cancer. Urban residents accounted for 852 cases (58.0%), whereas rural residents accounted for 618 cases (42.0%). No significant statistical relationship was detected linking cancer type with residential area ($\chi^2=1.645$, df=1, p=0.200).

Cancer type	Urban	Rural	Total	%
Lung	723	509	1232	83.81
Liver	129	109	238	16.19
Total	852	618	1470	100.0

Table 1: Cancer type by residential area

Table (2) shows that the highest number of registered cases 311, was observed in 2025. The number of 2026 refers to the first eight months of the year and thus is not directly comparable with complete calendar years.

Year	Urban	Rural	Total
2021	128	80	208
2022	155	100	255
2023	121	100	221
2024	145	119	264
2025	196	115	311
2026 (Jan–Aug)	107	104	211
Total	852	618	1470

Table 2: Recorded cases by year and residential area.

Table (3) shows the distribution of registered cases by sex. Males accounted for 995 cases (67.7%), whereas females accounted for 475 cases (32.3%).

Sex	Number of Cases	Percentage %
Male	995	67.7%
Female	475	32.3 %
Total	1470	100 %

Table 3: Distribution of cancer cases according to sex.

Table (4) indicates that lung cancer represented the largest proportion of registered cases, with 1,232 cases (83.81%) of the total cancer cases recorded, while liver cancer had 238 cases (16.19%). Therefore, the bulk of the cases recorded over the study period were for lung cancer.

Cancer type	Male	Female	Total	%
Lung	850	382	1232	83.81
Liver	145	93	238	16.19
Total	995	475	1470	100.0

Table 4: Distribution OF cancer type by sex.

Table (5) shows that registered cases were concentrated in the older age groups. Among patients aged 50 years and above, 1,290 cases (87.8%) were recorded. The largest single age group was 60–69 years (29.32%), followed by 70–79 years (27.21%) and 50–59 years (22.31%).

Age group	Liver	Lung	Total	%
<20	4	3	7	0.48
20–29	6	5	11	0.75
30–39	7	19	26	1.77
40–49	33	103	136	9.25
50–59	58	270	328	22.31
60–69	56	375	431	29.32
70–79	56	344	400	27.21
≥80	18	113	131	8.91
Total	238	1232	1470	100.00

Table 5: Age distribution by cancer type.

The distribution of lung and liver cancer cases according to age group and sex is shown in Table 6. There were 1,470 registered cases, including 995 males and 475 females. Lung cancer accounted for 1,232 cases (850 males and 382 females), whereas liver cancer accounted for 238 cases (145 males and 93 females). The largest share of all registered cases occurred in the 60–69 years (29.32%), with the 70–79 years (27.21%) and the 50–59 years (22.31%) ranking next.

Age group	Liver Female	Liver Male	Lung Female	Lung Male	Total
<20	2	2	1	2	7
20–29	4	2	2	3	11
30–39	5	2	8	11	26
40–49	16	17	39	64	136
50–59	24	34	77	193	328
60–69	17	39	108	267	431
70–79	17	39	103	241	400
≥80	8	10	44	69	131
Total	93	145	382	850	1470

Table 6: Distribution of cases by age group, cancer type, and sex.

The distribution of registered cancer cases according to cancer type, sex, and residential area is presented in Table 7. Pearson's chi-square test was applied to evaluate the relationship between cancer type with residential area, cancer type and sex, and sex and residential area.

Variables	Urban	Rural	Total	χ^2	df	P value	Interpretation
Male	603	392	995				
Female	249	226	475				
Total	852	618	1470				
Cancer type × residential area				1.645	1	0.200	Not significant
Cancer type × sex				5.938	1	0.0148	Significant
Sex × residential area				8.833	1	0.0030	Significant

Table 7: Distribution of cancer cases and Pearson chi-square tests of association between cancer type, sex, and residential area. **Note:** $\alpha = 0.05$. Pearson chi-square test, without continuity correction. The descriptive sex × residential-area counts are shown above to support the corresponding chi-square test.

4. Discussion

The present study described the hospital-based distribution of registered lung and liver cancer cases at the National Oncology Center in Najaf from 2021 through August 2026. A total of 1,470 registered cases were included. Lung cancer accounted for 1,232 cases (83.81%), while liver cancer accounted for 238 cases (16.19%). Males represented 995 cases (67.7%), and females represented 475 cases (32.3%). Because the study was based on hospital records and did not include population denominators, these proportions describe the composition of registered cases and should not be interpreted as population-based rates or as evidence that one kind of cancer is more common in the Najaf population overall. The high proportion of registered cases attributed to lung cancer is consistent with the large global burden of this malignancy documented in international cancer statistics [1][11]. Smoking is well established as a major contributor to lung cancer risk, as are other exposures such as radon and occupational or environmental carcinogens [5][13]. Smoking status and occupational and environmental exposures were not available in the present dataset. Liver cancer accounted for 16.19% of the registered cases. Chronic hepatitis B and C infections and chronic liver disease are established risk factors for hepatocellular carcinoma [12][14]. However, information on viral hepatitis status and additional clinical risk factors was not available in the present study. There was a significant relationship between patients' sex and the cancer type diagnosed (χ^2=5.938, df=1, p=0.0148). Although males represented the majority of both lung and liver cancer cases, liver cancer constituted a higher proportion of cases among females (93/475;19.6%) than among males (145/995;14.6%). Differences between males and females in cancer patterns have been described internationally and may be related to differences in exposure to risk factors, occupational environments, behaviors, and biological factors [19][20]. However, the current study did not obtain sufficient exposure or clinical information to determine which factors explain the observed association. The association between sex and residential area was also statistically significant (χ^2=8.833, df=1, p=0.0030). This finding describes the distribution of sex across residential categories among the registered cases and should not be interpreted as evidence that place of residence or sex has a causal effect on the occurrence of cancer.

Regarding residential area, 852 cases (58.0%) were from urban areas, whereas 618 cases (42.0%) were from rural areas. A previous study conducted in Al-Najaf also included urban and rural residence among the demographic features recorded for registered patients with lung cancer at the Middle Euphrates Oncology Center [15][17]. Based on Pearson's chi-square test, cancer type was not significantly related to residential area (χ^2=1.645, df=1, p=0.200). Thus, among the registered hospital cases, the distribution of lung and liver cancer by residential area did not differ significantly. This finding should be interpreted as a description of the registered cases rather than as evidence that residential area is unrelated to cancer risk. Studies of urban–rural cancer differences indicate that such patterns can vary according to cancer site and may be influenced by socioeconomic and healthcare-related factors [16].

Furthermore, the present study didn't provide population denominators or information on environmental exposures, healthcare access, or other potential confounders. Therefore, the observed urban–rural distribution cannot be

interpreted as a population-based difference in cancer incidence. Population -based cancer incidence rates require the number of newly diagnosed cases to be related to the population at risk, emphasizing the importance of population denominators when interpreting cancer incidence [18]. Patients aged 50 years and above comprised 1,290 cases (87.8%). Most cases were concentrated in the 60–69 year age group (431 cases; 29.32%), with the next highest numbers in the 70–79 year group (400 cases; 27.21%) and 50–59 years (328 cases; 22.31%). In lung cancer, registered cases peaked in the 60–69-year age group (375 cases), whereas liver cancer was most frequently registered among patients aged 50–59-years (58 cases). The concentration of cases in older age groups reflects the widely recognized association of advancing age with a greater cancer burden [21][22]. However, since the study was not population-based, the age distribution should be interpreted as the age composition of the registered cases rather than as an estimate of age-specific cancer risk.

The number of registered cases varied across calendar years. In 2025, 311 cases were registered. The total for 2026 was 211cases; however, these data included only January through August and therefore can't be directly compared with complete calendar years from 2021 through 2025. The increase observed in 2025 may be related to changes in case detection, referral patterns, healthcare utilization, or cancer registration, none of which were directly measured in the current study. Therefore, the observed year-to-year disease occurrence at the population level [23].

In summary, the results provide a useful description of the demographic and residential characteristics of lung and liver cancer registered at the study center. The main limitations are the hospital -based design, lack of population determinants, including tobacco use, viral hepatitis status, work-related and environmental exposures, and access to healthcare. Future population-based studies with standardized case ascertainment, appropriate population denominators, and detailed clinical and exposure information would provide stronger evidence regarding the determinants of lung and liver cancer in Najaf [24][25].

5. Ethical Considerations

All information on patients was collected from hospital records for research. Patient identifiers were removed to ensure patient privacy and confidentiality. This investigation was conducted following medical research ethics.

6. Conclusion

This hospital -based retrospective study described the distribution of registered lung and liver cancer cases at the National Oncology Center in Najaf between 2021 and August 2026. Lung cancer represented the largest proportion of recorded cases, and most cases occurred among older adults. Male patients made up a larger share of the registered patient population than females. A significant relationship was detected between the type of cancer and sex, whereas cancer type showed no meaningful statistical link with the residential area. These findings should be interpreted as a description of registered hospital cases rather than population- based disease rates. Further population-based studies incorporating smoking history, viral hepatitis status, environmental exposures, and healthcare access are needed to investigate the determinants of lung and liver cancer in Najaf.

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