

Analysis of the Onset and Mortality of Common Malignant Tumors Among Registered Residents in Xishan District in 2016

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Abstract: Objective: To analyse the cancer incidence and mortality in xishan district in 2016, and to provide scientific basis for tumor prevention and control.

Methods: The 2016 malignant tumor registration report data in xishan district were collected and analysed, stratified according to gender and age, and the reported incidence of malignant tumor in xishan district was calculated and analysed (all the following incidence rates belong to the reported incidence), gender, age incidence, bid acceptance rate, mortality and other related indicators. **Results:** The total registered population of malignant tumor in xishan district in 2016 was 540,494 (268 553 males and 271 941 females), and 876 new cases were reported. The incidence rate was 162.07/105, the bid-winning rate was 176.39 /105, the world standard rate was 91.16/105, and the cumulative rate (0-74 years old) was 10.44%. The incidence of malignant tumors in males (159.00/105) was lower than that in females (165.11/105). Incidence increases with age, rises sharply and rapidly around age 40, and declines after reaching a peak at age 75. Lung cancer, colorectal cancer, thyroid cancer and female breast cancer are common malignant tumors in the western mountainous areas. It accounts for about 55% of the total number of new malignant tumors. In 2016, 653 people died of malignant tumors in xishan district. The mortality rate was 120.82/105 (male mortality 151.11/105, female mortality 90.46/105), the bid-winning mortality rate was 43.53/105, and the bid-winning mortality rate was 57.72/105. Lung cancer, liver cancer, colorectal cancer and stomach cancer are the malignant tumors with high mortality, accounting for about 62% of the death. **Conclusion:** The morbidity

and mortality of malignant tumors are relatively high in xishan district, and prevention and control of lung cancer, liver cancer, stomach cancer, colorectal cancer, female breast cancer and thyroid cancer should be emphasized.

Keywords: Cancer; Incidence rate; Mortality; Prevent

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1 Introduction

Since the 21st century, tumors have become one of the leading causes of death worldwide, seriously threatening human health and life expectancy^[1]. With the acceleration of the urbanization, industrialization and aging in China, tumors (cancers) have become one of the most important chronic diseases that endanger the lives and health of Chinese residents. According to the World Health Organization's International Agency for Research on Cancer (WHO / IARC) Globocan2012 prediction, the cancer onset and death in China will continue to increase in the next 20–30 years, especially as the urban populations in the 21st century. Various pollutions in modern society are threatening human health. According to the China Cancer Registry Annual Report 2017, lung cancer, colorectal cancer, upper gastrointestinal cancer, breast cancer, and liver cancer are the top five cancers in urban residents in China, accounting for more than 60% of all new cancer cases. Yunnan Province has more than 80 000 new cancer cases and more than 50 000 deaths each year. The

situation of prevention and control is serious. There are more than 1500 new tumor cases each year in Xishan District, including more than 600 deaths. Prevention and control are still very serious. By analyzing the data of the tumor reports of residents in Xishan District in 2016, it is hoped to establish an integrated work system for reporting, collection, follow-up, storage, sorting, and analysis of tumor registration for Xishan District residents, and provide accurate and timely scientific evidence for tumor prevention and control.

2 Materials and methods

2.1 Source of information

2.1.1 Demographic

Sourced from the demographic data provided by Xishan Statistics Bureau.

2.1.2 Information on new cases and deaths

New cases and deaths are mainly from three sources: (1) Reports of in-patient visits to medical institutions at various levels; (2) County-township-village three-level network reporting system; (3) Reports of residents' death due to tumor according to monitoring system.

2.1.3 Quality control

The main quality control indicators are data that undergone quality control in accordance with the "Guideline of China Cancer Registry Work".

2.2 Statistical analysis methods

SPSS 17.0 and Excel 2010 were used to stratify the age and sex to calculate tumor onset and mortality, standardization rate, cumulative rate (0–74 years) and the top 10 tumor onset, death order and composition. China's population standardization rate (referred to as the standard target rate) and world population standardization rate (referred to as the world standard rate) adopt the standard population age composition of the National Census and Segi 2000's world standard population age composition as the standard population^[2].

3 Results

3.1 Onset rate of malignant tumors

In 2016, a total of 876 new cases of malignant tumors were reported in the tumor registration of residents in Xishan District. The onset rate was 162.07/100,000,

the standard target rate was 71.72/100,000, the world standard rate was 90.13/100,000, and the cumulative rate (0–74 years) was 10.44%.

3.2 Age-specific onset rate of malignant Tumors

The malignant tumors of residents in Xishan District rose sharply and rapidly around the age of 40, and began to decline after reaching the peak at the age of 75. A trend of increased onset rate with age was shown from 10 – 80 years old, in which the peak appears in the 75-year-old age group (448.38/100,000), the 20- to 30-year-old group start declining, and the 80-year-old declines (Table 1). In 2016, Xishan District had statistically significant differences in the onset rates of <30, 30 – 35, 40 – 45, 50 – 55, 60 – 65, 70 – 75, and 80-age groups ($\chi^2 = 677.492$, $P < 0.05$) (Table 2).

Table 1. Age-specific onset rate of tumors in Xishan residents in 2016 (1/100,000)

Age group	Total	Male	Female
0-	0.00	0.00	0.00
1-	0.00	0.00	0.00
5-	0.00	0.00	0.00
10-	4.83	9.54	0.00
15-	8.50	0.00	17.21
20-	17.43	17.63	17.24
25-	16.01	20.29	12.16
30-	54.65	33.43	73.26
35-	76.91	42.94	109.34
40-	109.03	71.71	147.37
45-	152.47	123.64	181.65
50-	190.46	124.60	256.02
55-	282.60	227.83	335.95
60-	330.94	341.31	320.90
65-	401.31	511.36	285.79
70-	442.98	511.58	370.99
75-	448.38	540.94	355.96
80-	345.29	395.87	296.83
85+	300.46	465.87	159.17
Total	162.07	159.00	165.11

Table 2. Age Group * Status Crosstab (Table 3)

		Onset	Not onset	
Age group	<30	12	145272	145284
	30-35	54	81277	81331
	40-45	133	101992	102125
	50-55	188	82599	82787
	60-65	254	70245	70499
	70-75	166	37109	37275
	80-	69	21124	21193
	Total	876	539618	540494

Continued table 2: χ^2 test

	Value	Degrees of freedom	Asymptotic significance (both sides)
Pearson's	677.492 ^a	6	.000
Likelihood ratio (L)	739.574	6	.000
Linear correlation	628.056	1	.000
Number of valid cases	540494		
^a The expected count of 0 cell (0.0%) is less than 5. The minimum expected count is 34.35.			

3.3 Sex onset rate of malignant tumors

In 2016, the total number of malignant tumors among residents in Xishan District was 427 males and 449 females. The male onset rate was 159.00/100,000, the standard target rate was 65.39/100,000, the cumulative rate was 10.18%, and the female onset rate was 165.11/100,000, the standard target rate is 77.71/100,000, and the cumulative rate is 10.64%. The onset rate is higher in men than in women in the 20-, 25-year-old and 60- to 85-year age groups, and higher in women than in men in the 30- to 55-year age group. The overall onset rate was lower in men than in women, and there was no significant difference between the two ($\chi^2 = 0.312$, $P > 0.05$).

3.4 Malignant tumor mortality

In 2016, 653 death cases were reported in Xishan District, with a malignant tumor mortality rate of 120.82/100,000, a standard target rate of 43.53/100,000, a world standard rate of 57.72/100,000, and a cumulative rate (0 to 74 years) of 6.13%.

3.5 Mortality rate of age-specific malignant tumor

The tumor mortality rate of residents in Xishan District increased with age from 25-to 80-age group. The 60-age group suddenly decreased, the 80-age group had the highest mortality rate, and the 85 plus-age group experienced a decline in mortality rate (Table 3). In Xishan District in 2016, there were statistically significant differences in onset rates between the 30, 30 – 35, 40 – 45, 50 – 55, 60 – 65, 70 – 75, and 80-age groups ($\chi^2 = 1483.253$, $P < 0.05$) (Table 4).

Table 3. Tumor age-specific mortality rate of residents in Xishan District (1/100,000)

Age group	Total	Male	Female
0-	0.00	0.00	0.00
1-	4.98	9.62	0.00
5-	8.84	8.61	9.10
10-	4.83	9.54	0.00
15-	4.25	8.40	0.00
20-	13.07	26.44	0.00
25-	3.20	20.29	6.08
30-	7.81	0.00	14.65
35-	20.98	0.00	27.34
40-	30.61	30.20	31.03
45-	46.14	43.87	48.44
50-	84.21	100.48	68.01
55-	200.55	277.09	125.98
60-	175.20	222.60	129.32
65-	278.87	365.25	188.21
70-	342.96	427.87	253.83
75-	534.37	737.64	331.41
80-	825.33	998.28	659.63
85+	794.08	1024.9	596.90
Total	120.82	151.55	90.46

Table 4. Age group * Status Crosstab (Table 5)

		Dead	Not dead	
Age group	<30	7	145277	145284
	30-35	12	81319	81331
	40-45	39	102086	102125
	50-55	108	82679	82787
	60-65	154	70345	70499
	70-75	159	37116	37275
	80-	172	21021	21193
	Total	651	539843	540494

Continued table 4: χ^2 test

	Value	Degree of freedom	Asymptotic significance (both sides)
Pearson's	1483.253 ^a	6	.000
Likelihood ratio (L)	1075.755	6	.000
Linear correlation	1096.847	1	.000
Number of valid cases	540494		

^aThe expected count of 0 cell (0.0%) is less than 5. The minimum expected count is 25.53.

3.6 Sex mortality rate of malignant tumors

The total number of malignant tumor deaths among residents in Xishan District in 2016 was 407 males and 246 females. The male mortality rate was 151.55/100,000, the standard target rate was 55.98/100,000, the cumulative mortality rate was 7.74%, the female mortality rate was 90.46/100,000, the standard target rate was 32.07/100,000, and the cumulative rate was 4.51%. The overall mortality rate was higher in men than in women, and the difference was statistically significant ($\chi^2=41.791$, $P<0.05$).

3.7 Distribution of major cancer types

3.7.1 Top ten onset cases of malignant tumors

In 2016, the first occurrence of malignant tumors in residents of Xishan District was lung cancer (25.90/100,000), followed by colorectal cancer and thyroid cancer. Lung cancer (18.32/100,000) was the first occurrence of male malignant tumors, accounting for 23%, followed by colorectal cancer, prostate cancer and liver cancer. The first occurrence of malignant tumors in women was breast cancer (17.58/100,000), accounting for 21%, followed by thyroid cancer, colorectal cancer, and lung cancer (see Table 5 and Figure 1 for details).

3.7.2 Top ten mortality cases of malignant tumors

In 2016, the mortality rate of malignant tumors among residents in Xishan District ranked first in lung cancer, followed by liver cancer, colorectal cancer, gastric cancer, and pancreatic cancer. The death order of men was lung cancer, which ranked first in lung cancer (24.61/100,000), accounting for 33%, followed by liver cancer, colorectal cancer, gastric cancer and prostate cancer. Whereas, the malignant tumor ranked first in female death was lung cancer (8.51/100,000), accounting for 19%, followed by liver cancer, colorectal cancer, and gastric cancer (See Table 6 and Figure 2).

Table 5. Onset order of malignant tumors among residents in Xishan District in 2016

Order		Total		Male			Female		
	Part	Onset rate (1/10 ⁵)	Target standard rate (1/10 ⁵)	Part	Onset rate (1/10 ⁵)	Target standard rate (1/10 ⁵)	Part	Onset rate (1/10 ⁵)	Target standard rate (1/10 ⁵)
1	Lung cancer	25.9	9.64	Lung cancer	18.32	6.79	Breast cancer	17.58	7.38
2	Colorectal cancer	25.35	9.91	Colorectal cancer	14.8	5.78	Thyroid cancer	15.73	10.12
3	Thyroid cancer	19.98	12.95	Prostate cancer	6.11	4.12	Colorectal cancer	10.55	4.14
4	Breast cancer	17.75	8.11	Liver cancer	5.00	2.18	Lung cancer	7.59	2.85
5	Cervical cancer	7.4	3.53	Gastric cancer	4.26	1.59	Cervical cancer	7.4	3.53
6	Gastric cancer	7.4	2.87	Thyroid cancer	4.26	2.83	Ovarian cancer	3.33	1.42
7	Liver cancer	7.22	3.54	Bladder cancer	3.33	0.97	Gastric cancer	3.15	1.28
8	Prostate cancer	6.11	1.73	Pancreatic cancer	2.41	0.95	Brain, nervous system	2.41	0.93
9	Bladder cancer	5.18	1.76	Renal and urinary system	2.41	1.06	Liver cancer	2.22	1.36
10	Leukemia	4.63	2.25	Leukemia	2.41	0.88	leukemia	2.22	0.99

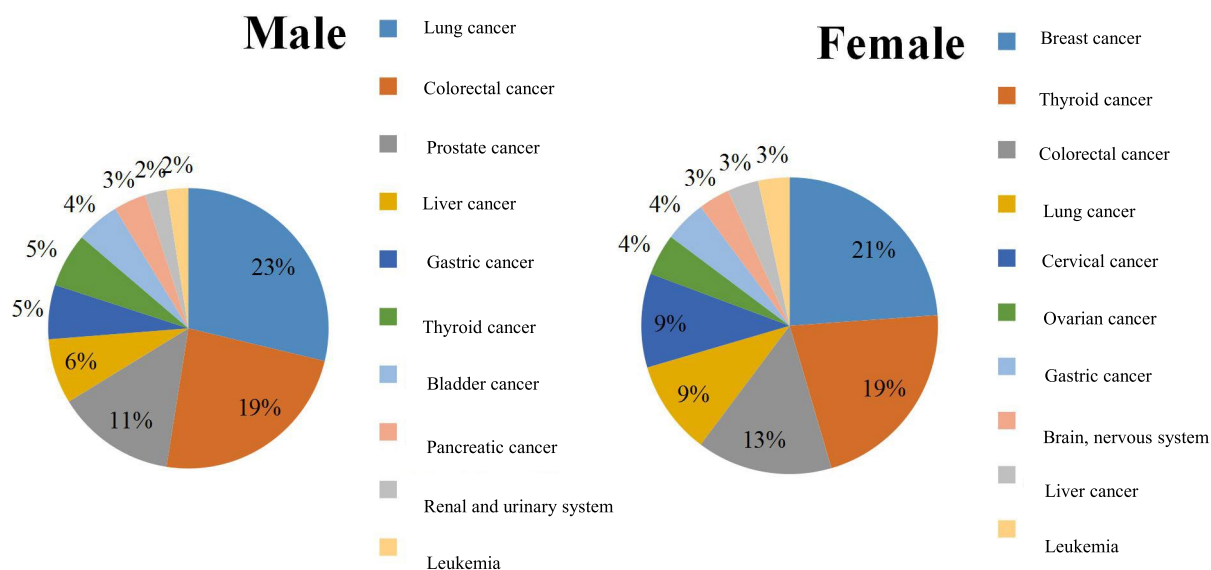


Figure 1. Composition ratio of top ten cancer types in the onset order of malignant tumors in Xishan District in 2016

Table 6. Malignant tumor death ranks of residents in Xishan District in 2016

Order	Total			Male			Female		
	Part	Mortality rate (1/10 ⁵)	Target standard rate (1/10 ⁵)	Part	Mortality rate (1/10 ⁵)	Target standard rate (1/10 ⁵)	Part	Mortality rate (1/10 ⁵)	Target standard rate (1/10 ⁵)
1	Lung cancer	25.9	9.64	Lung cancer	18.32	6.79	Lung cancer	17.58	7.38
2	Liver cancer	25.35	9.91	Liver cancer	14.8	5.78	Liver cancer	15.73	10.12
3	Colorectal cancer	19.98	12.95	Colorectal cancer	6.11	4.12	Colorectal cancer	10.55	4.14
4	Gastric cancer	17.75	8.11	Gastric cancer	5.00	2.18	Gastric cancer	7.59	2.85
5	Pancreatic cancer	7.4	3.53	Prostate cancer	4.26	1.59	Pancreatic cancer	7.4	3.53
6	Leukemia	7.4	2.87	Leukemia	4.26	2.83	Ovarian cancer	3.33	1.42
7	Brain, nervous system	7.22	3.54	Esophageal cancer	3.33	0.97	Breast cancer	3.15	1.28
8	Prostate cancer	6.11	1.73	Pancreatic cancer	2.41	0.95	Brain, nervous system	2.41	0.93
9	Breast cancer	5.18	1.76	Bladder cancer	2.41	1.06	Cervical cancer	2.22	1.36
10	Ovarian cancer	4.63	2.25	Brain, nervous system	2.41	0.88	Leukemia	2.22	0.99

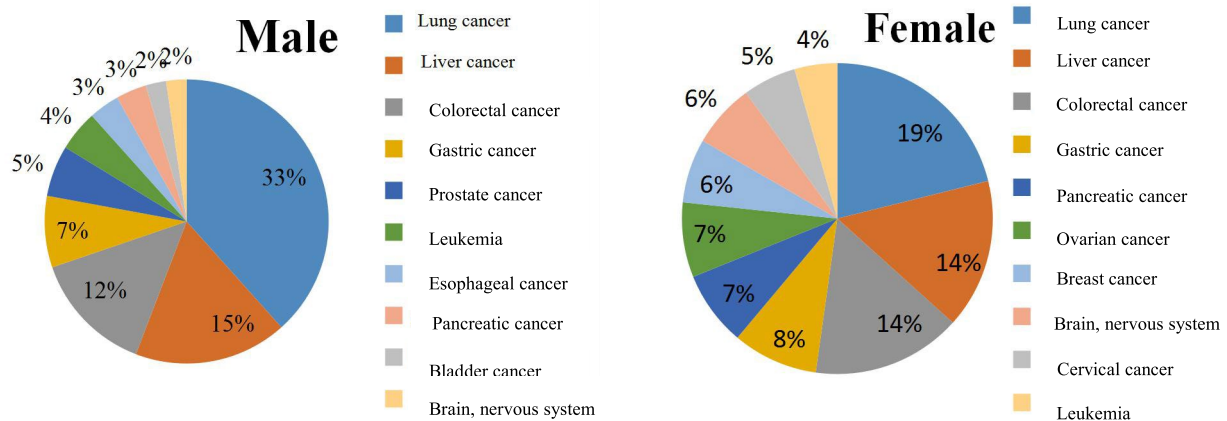


Figure 2. Composition ratio of top ten cancer types in the death order of malignant tumors in Xishan District in 2016

4 Discussions

This analysis shows that lung cancer, liver cancer, colorectal cancer and gastric cancer are the top 4 malignant tumors in the death rate of residents in Xishan District. In addition, the onset rate of thyroid cancer and breast cancer among the female population in Xishan District ranks among the top two. Consistent with the conclusions of Yunnan Province in 2014, Shanghai City in 2015, and Zhejiang Province in 2015, are all common malignant tumors, suggesting that the prevention and control should be strengthened on lung cancer, liver cancer, colorectal cancer, gastric cancer and high onset rate of thyroid and breast cancer in woman^[2-4].

Lung cancer ranks the first in the death order of males and females, indicating that lung cancer is still the primary problem faced by Xishan District's resident in preventing and controlling. Epidemiological studies have shown that smoking is the leading risk factor for lung cancer, and more than half of lung cancer patients are attributed to this risk factor^[5]. In the United States, the United Kingdom, and other countries, the mortality rate of lung cancer among men has declined, and not continued growing in women, indicating that restrictions on tobacco consumption and second hand smoke may effectively control the epidemic of lung cancer^[6-8].

The high morbidity and mortality of colorectal cancer is also of particular concern. Studies have shown that unhealthy eating habits, obesity, and lack of physical activity can cause high onset of colorectal cancer^[9-10]. In this regard, a healthy lifestyle should be actively promoted. The incidence of liver cancer and gastric cancer is sixth and seventh, respectively, but liver cancer and gastric cancer are still the second most

common malignant tumors for men and women, and they are still the focus of prevention and control.

The onset rate of breast cancer ranks first among women, which is related to the absence of breastfeeding, the short cycle of breastfeeding, and the increase in obesity rates that resulted in high incidence of breast cancer^[11-15]. Screening for breast cancer should be strengthened and good health education provided. The onset rate of thyroid cancer ranks second in women, and third in the entire population, but the mortality rate is lower than the death order. However, the real cause of the high onset rate of thyroid cancer is completely unclear. Most studies believe that it is caused by over-diagnosis in a large-scale screening and promotion of head and neck ultrasound in asymptomatic people^[16]. In this regard, monitoring and actively exploration should be strengthened. Take more active and effective anti-cancer measures, promote healthy lifestyles, and reduce your exposure to cancer risk factors. Secondly, actively carry out health education and community cancer prevention interventions, and continue to promote effective tertiary prevention to achieve early detection, early diagnosis and early treatment.

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