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Analysis of the Incidence and Mortality of Common Malignant Tumors in the Xishan District Residence in 2016

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Abstract: ***Objective:*** To analyze 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 analyzed, stratified according to gender and age, and the reported incidence of malignant tumor in xishan district was calculated and analyzed (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. ***Conclusions:*** 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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Since the 21st century, tumors have become one of the leading causes of death worldwide which seriously threatening human health and life expectancy[1]. With the acceleration of the process of 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 prediction of World Health Organization's International Cancer Research Agency (WHO/IARC) Globocan 2012, the number of tumors and deaths in China will continue to increase in the next 20-30 years, especially as urban populations enter the 21st century. All kinds of pollution in modern society are threatening human health. According to the 2017 China Cancer Registry Annual Report, 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. There are more than 80,000 new cancer cases and more than 50,000 deaths occur every year in Yunnan Province. Prevention and control are severe. There are

more than 1,500 new tumor cases each year in the Xishan District, including more than 600 deaths. Prevention and control are still very serious. After analyzing the data of the tumor reports of Xishan District residents in 2016, it is hoped to establish a system that integrates reporting, collection, follow-up, storage, sorting, and analysis for the registration of tumors in the Xishan residents, and provide accurate and timely scientific evidence for tumor prevention and control.

1 Materials and methods

1.1 Source of information

1.1.1 Demographic

From the demographic data provided by the Xishan District Statistics Bureau.

1.1.2 Information on new cases and death cases

Data on new cases and deaths are mainly from three sources: (1) Reports of cases received in hospitals at all levels and types of medical institutions; (2) County-township-village three-level network reporting system reports; (3) Cases reported due to tumor death by the residents' death cause monitoring system.

1.2 Quality control

The main quality control indicators are data quality control according to the quality control of the "China Cancer Registry Work Guide".

1.3 Statistical analysis methods

Using SPSS17.0 and Excel 2010, stratification by age and sex was used to calculate tumor incidence and mortality, standardized rate, cumulative rate (0 – 74 years), and the order and composition of the top 10 tumor incidence and death. China's population standardization rate (known as the successful bid rate) and world population standardization rate (known as the world standard rate) have adopted the standard population age composition of the 2000 National Census and Segi's world standard population age composition as the standard population[2].

2 Results

2.1 The incidence rate of malignant tumors

In 2016, a total of 876 new cases of malignant tumors were reported in the tumor registration of residents in the Xishan District. The incidence rate was 162.07 in 100,000, the successful bid rate was 71.72 in 100,000, the world standard rate was 90.13 in 100,000 and the cumulative rate (aged 0 to 74) was 10.44%.

2.2 The incidence rate of age-specific malignant tumors

The malignant tumors of residents in the Xishan District rose sharply and rapidly around the age of 40 and began to decline after reaching the peak at the age of 75. It shows a trend of increasing incidence with age of 10 – 80 years old, the peak appears in the 75-year-old age group (448.38 in 100,000), the 20- to 30-year-old group declines, and the 80-year-old declines (Table 1). The difference in incidence of Xishan District in 2016 was <30, 30 – 35, 40 – 45, 50 – 55, 60 – 65, 70 – 75, and 80-age group was statistically significant (χ^2 = 677.492, P<0.05) (Table 2 and Table 3).

Table 1. Age-specific incidence of tumors in residents of Xishan District in 2016 (1 in 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

Continued table 1

Age group	Total	Male	Female
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

Age group	Onset	Not onset	
< 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

Table 3. Chi-square test

	Value	Degrees of freedom	Progressive saliency (both sides)
Person Chi-square	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 for 0 cell (0.0%) is less than 5. The minimum expected count is 34.35.

2.3 The sexual mortality rate of malignant tumors

In 2016, the total number of malignant tumors among residents in the Xishan District was 427 males and 449 females. The male incidence rate was 159.00 in 100,000, the successful bid rate was 65.39 in 100,000 and the cumulative rate was 10.18%. The female incidence rate was 165.11 in 100,000, The successful bid rate is 77.71 in 100,000, and the cumulative rate is 10.64%. The incidence 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 incidence was lower in men than in women, and there was no significant difference between the two ($\chi^2 = 0.312$, P > 0.05).

2.4 The mortality rate of malignant tumor

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

2.5 Malignant tumors age-specific mortality rate

The tumor mortality rate of residents in the Xishan District increased with age in the 25- to 80-age group, suddenly decreased in the 60-age group, had the highest mortality rate in the 80-age group, and experienced a decline in mortality in the 85 plus age group (See Table 4). In the Xishan District in 2016, there were statistically significant differences in incidence 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 5 Table 6).

Table 4. Tumor age-specific mortality rate of residents in the Xishan District (1 in 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 5. Age group* status crosstab

Age group	Dead	Not dead	
< 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

Table 6. Chi-square test

	Value	Degrees of freedom	Progressive saliency (both sides)
Person Chi-square	1483.253[a]	6	.000
Likelihood ratio (L)	1075.755	6	.000
Linear correlation	1096.847	1	.000
Number of valid cases	540494		

a.The expected count for 0 cell (0.0%) is less than 5. The minimum expected count is 25.53.

2.6 The sexual mortality rate of malignant tumors

Among the total number of malignant tumor deaths among the residents in Xishan District in 2016, there were 407 males and 246 females. The male mortality rate was 151.55 in 100,000, the successful bid rate was 55.98 in 100,000, the cumulative mortality rate was 7.74%. The female mortality rate was 90.46 in 100,000, the successful bid rate was 32.07 in 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 ($\chi^2 = 41.791$, $P < 0.05$).

2.7 Distribution of major types of cancer

2.7.1 Top ten malignant tumors before the onset

In 2016, the first occurrence of malignant tumors in residents of Xishan District was lung cancer (25.90 in 100,000), followed by colorectal cancer and thyroid cancer. Lung cancer (18.32 in 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 in 100,000), accounting for 21%, followed by thyroid cancer, colorectal cancer, and lung cancer (see Table 7 and Figure 1 for details).

2.7.2 Top ten malignant tumors before death

In 2016, the death order of malignant tumors among residents in Xishan District ranked first in lung cancer, followed by liver cancer, colorectal cancer, gastric cancer, and pancreatic cancer. Lung cancer ranks first in males (24.61 in 100,000), accounting for 33%, followed by liver cancer, colorectal cancer, gastric cancer, and prostate cancer. The first malignant tumor in female deaths is lung cancer (8.51 in 100,000), accounting for 19%, followed by liver cancer, colorectal cancer, and gastric cancer (See Table 8 and Figure 2).

Table 7. Malignant tumors incidence order of residents in Xishan District in 2016

Order	Total			Male			Female		
	Type	Incidence ($1/10^5$)	Successful bid rate ($1/10^5$)	Type	Incidence ($1/10^5$)	Successful bid rate ($1/10^5$)	Type	Incidence ($1/10^5$)	Successful bid 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	1.52
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 the top ten cancer types in the malignant tumors' incidence order in Xishan District in 2016.

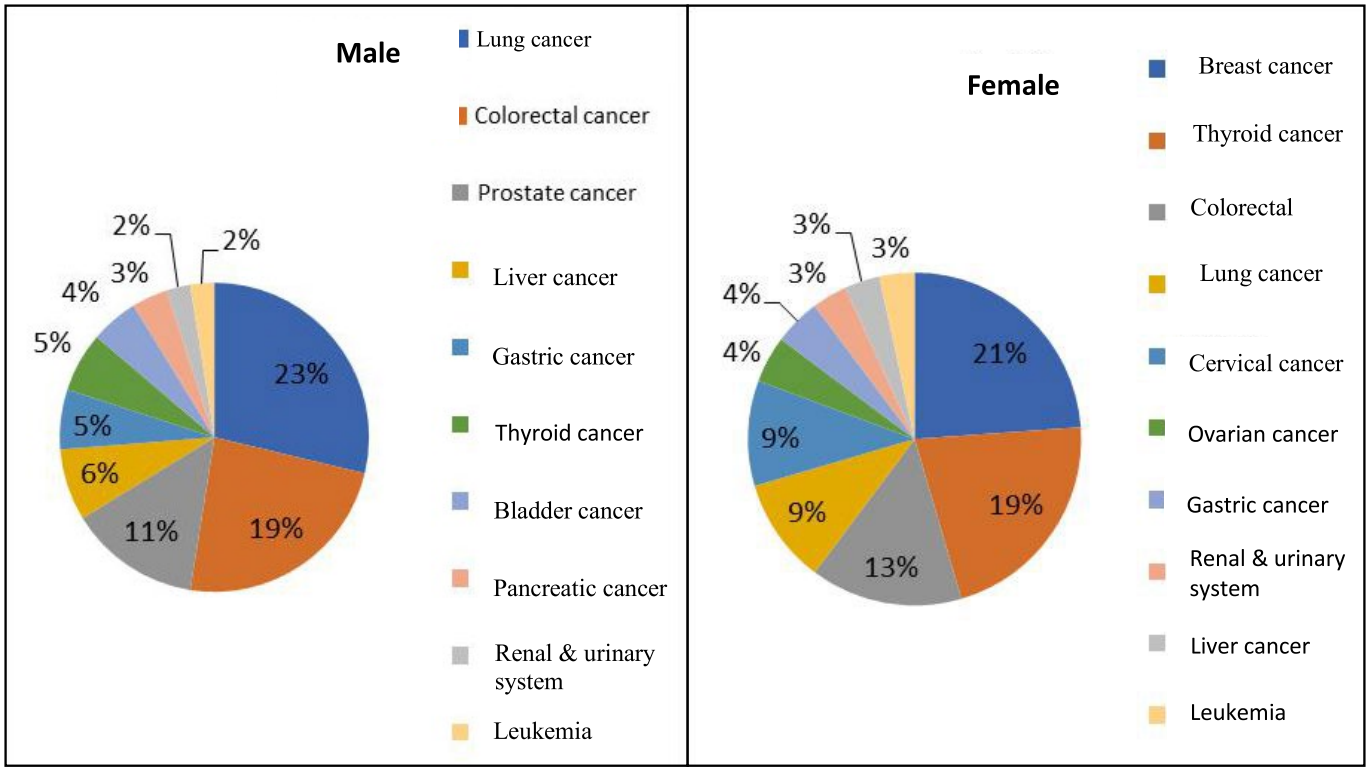
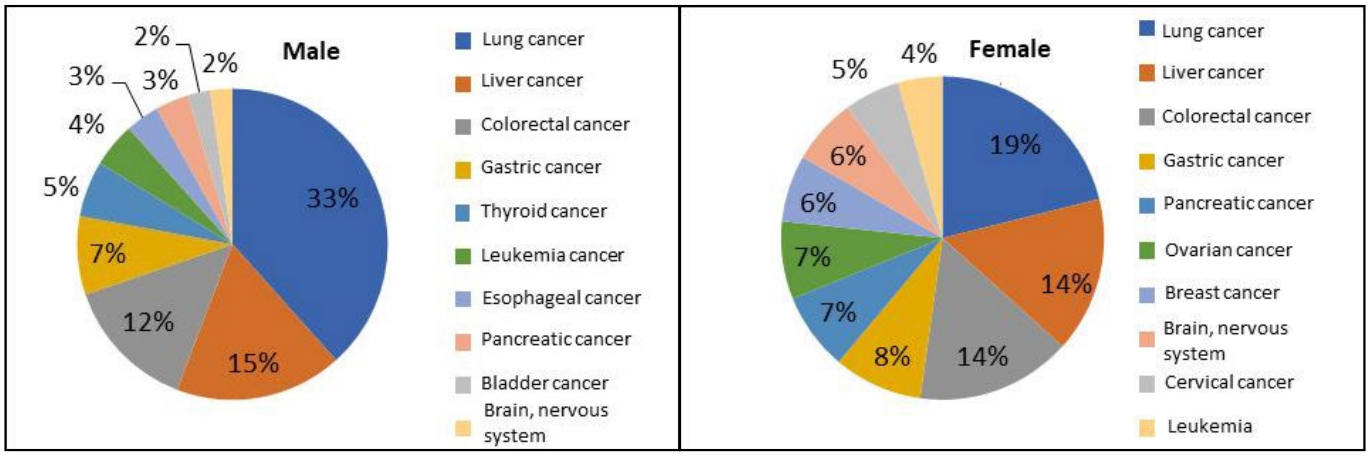


Table 8. Malignant tumor death order of residents in Xishan District in 2016

Order	Total			Male			Female		
	Type	Death rate ($1/10^5$)	Successful bid rate ($1/10^5$)	Type	Death rate ($1/10^5$)	Successful bid rate ($1/10^5$)	Type	Death rate ($1/10^5$)	Successful bid rate ($1/10^5$)
1	Lung cancer	33.12	10.32	Lung cancer	24.61	7.76	Lung cancer	8.51	2.56
2	Liver cancer	17.76	6.19	Liver cancer	11.47	4.09	Liver cancer	6.66	2.1
3	Colorectal cancer	15.54	4.64	Colorectal cancer	8.88	2.71	Colorectal cancer	6.26	1.93
4	Gastric cancer	8.51	3.09	Gastric cancer	5.18	1.84	Gastric cancer	3.33	1.24
5	Pancreatic cancer	5.74	1.92	Thyroid cancer	3.52	0.91	Pancreatic cancer	3.15	1.11
6	Leukemia	4.63	2.17	Leukemia	2.96	1.38	Ovarian cancer	3.15	1.23
7	Renal & urinary system	4.44	2.5	Esophageal cancer	2.59	0.98	Breast cancer	2.96	1.31
8	Prostate cancer	3.52	0.92	Pancreatic cancer	2.59	0.82	Brain nervous system	2.41	1.37
9	Breast cancer	3.52	1.45	Bladder cancer	1.85	0.71	Cervical cancer	2.41	0.85
10	Ovarian cancer	3.15	1.23	Brain nervous system	1.85	0.76	Leukemia	1.67	0.8

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



3 Discussion

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 the Xishan District. In addition, the incidence of thyroid cancer and breast cancer in the female population in Xishan District ranks in the top two. Position, consistent with the conclusions of Yunnan Province in 2014, Shanghai City in 2015, and Zhejiang Province in 2015, are common malignant tumors[2-4]. It is suggested that the prevention and control of lung cancer, liver cancer, colorectal cancer, gastric cancer, and thyroid cancer and breast cancer with high incidence in women should be strengthened.

Lung cancer ranks first in the death order of men and women, indicating that lung cancer is still the major problem faced by tumor prevention and control among residents in Xishan District. Epidemiological studies have shown that smoking is the leading risk factor for lung cancer, and more than half of lung cancer patients can be blamed for this risk factor[5]. In the United States, the United Kingdom, and other countries, the death rate of lung cancer among men has declined, and have not continued to grow among women, indicating that restrictions on tobacco consumption and secondhand smoke may effectively control the epidemic of lung cancer[6-8].

The high morbidity and mortality of colorectal cancer are also of particular concern. Studies have shown that factors such as unhealthy diet, obesity, and lack of physical activity can lead to a high incidence 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 incidence of breast cancer ranks first among women, which is related to the absence of breastfeeding, the short cycle of breastfeeding, and the increased incidence of obesity leading to a high incidence of breast cancer[11-16]. Screening for breast cancer should be strengthened and health education should be promoted. The incidence of thyroid cancer ranks second in the incidence of women and third in the incidence of the entire population, but its mortality rate is lower in the death order. However, the real cause of the high incidence of thyroid cancer is not completely clear. Most studies believe that it is caused by overdiagnosis due to the large-scale screening and promotion of head and neck ultrasound in asymptomatic people. In this respect, we should strengthen monitoring and actively investigate the cause. More active and effective anti-cancer measures should be taken, and healthy lifestyles should be promoted to reduce exposure to cancer risk factors. Secondly, health education and community cancer prevention interventions should be actively carried out to continuously promote effective tertiary prevention in order to achieve early detection, early diagnosis, and early treatment.

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