

Analysis of Trends of Cancer Epidemiology in Two Provinces of the Western and Eastern China

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Abstract: In this paper, the literature on the incidence and death of malignant tumors in the Chongqing and Jiangsu provinces from 2014–2016 was collected through a literature review. The overall incidence, mortality, tumor spectrum, and possible risk factors of malignant tumor incidence and death in the Chongqing and Jiangsu provinces were compared and analyzed. This aims to provide references and suggestions for the prevention and control of malignant tumors in China.

Keywords: Cancer; Incidence; Mortality

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1. Introduction

Using the keywords “malignant tumor, incidence, death, China, Chongqing, Jiangsu Province,” we searched 9 literature on the incidence and death of malignant tumors in the Chongqing and Jiangsu Provinces from 2014–2016. Chen *et al.* wrote 3 papers on the incidence and death of malignant tumors in China in 2014, 2015, and 2016^[1–3]. Ding *et al.* wrote 3 papers on the analysis of the incidence and death of malignant tumors in Chongqing from 2014–2016^[4–6]. Han *et al.* wrote 3 papers on the analysis of the incidence and death of malignant tumors in the Jiangsu Province from 2014–2016^[7–9].

2. Results

According to literature reports, researchers collected the overall incidence of malignant tumors in the Chongqing and Jiangsu Provinces from 2014–2016, as shown in **Figure 1**. Compared with the total incidence of malignant tumors in men and women reported nationwide (278.07/100,000 in 2014, 285.83/100,000 in 2015, 293.91/100,000 in 2016)^[1–3], the total incidence of male and female malignant tumors in Chongqing from 2014–2016 was slightly lower than that of the whole country, and that of Jiangsu was slightly higher than that of the whole country. Compared with the national incidence of male malignant tumors (301.67/100,000 in 2014, 305.47/100,000 in 2015, 315.52/100,000 in 2016)^[1–3], the incidence of male malignant tumors in Chongqing in 2014 was lower than

the national level. The incidence of male malignant tumors in Chongqing in 2015 and 2016 was higher than the national level, and the incidence of male malignant tumors in Jiangsu Province from 2014–2016 was significantly higher than the national level, which was slightly higher than that of Chongqing. Compared with the national incidence of malignant tumors in females (253.29/100,000 in 2014, 265.21/100,000 in 2015, 271.23/100,000 in 2016) [1-3], the incidence of malignant tumors in females in Chongqing from 2014–2016 was significantly lower than the national level. The incidence of malignant tumors in women in Jiangsu Province in 2015 was similar to the national data and was slightly higher than the national level in 2014 and 2016.

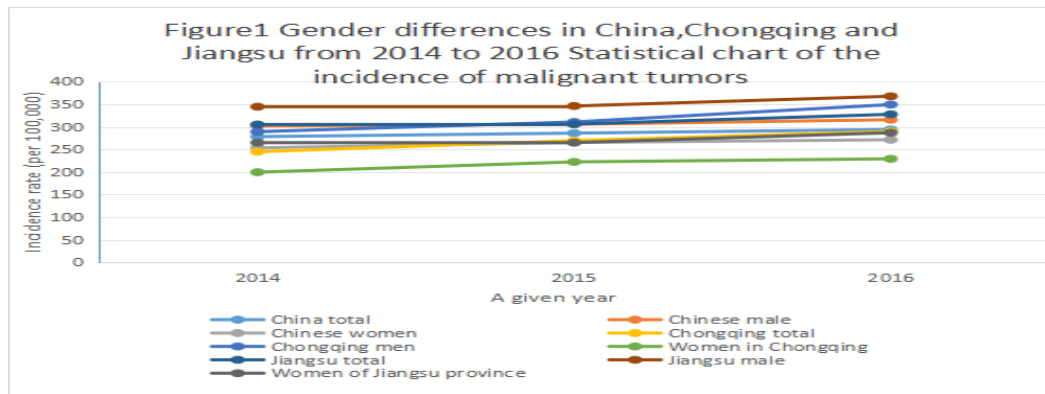


Figure 1. Incidence of malignant tumors in the Chongqing and Jiangsu provinces from 2014–2016

As shown in **Figure 2**, compared with the national reported total mortality rate of male and female malignant tumors (167.89/100,000 in 2014, 170.05/100,000 in 2015, 174.55/100,000 in 2016) [1-3], the total mortality rate of male and female malignant tumors in Chongqing in 2015 was slightly higher than the national level. In 2014 and 2016, the total mortality rate of male and female malignant tumors in Jiangsu Province was significantly higher than the national level. Compared with the national mortality rate of male malignant tumors (207.24/100,000 in 2014, 210.10/100,000 in 2015, 216.16/100,000 in 2016) [1-3], the mortality rate of male malignant tumors in Chongqing from 2014–2016 was slightly higher than the national level. The male mortality rate of malignant tumors in Jiangsu Province from 2014–2016 was significantly higher than the national level. Compared with the national mortality rate of female malignant tumors (126.54/100,000 in 2014, 128.00/100,000 in 2015, 130.88/100,000 in 2016) [1-3], the mortality rate of female malignant tumors in Chongqing from 2014–2016 was slightly lower than the national level. The female mortality rate of malignant tumors in Jiangsu Province from 2014–2016 was slightly higher than the national level.

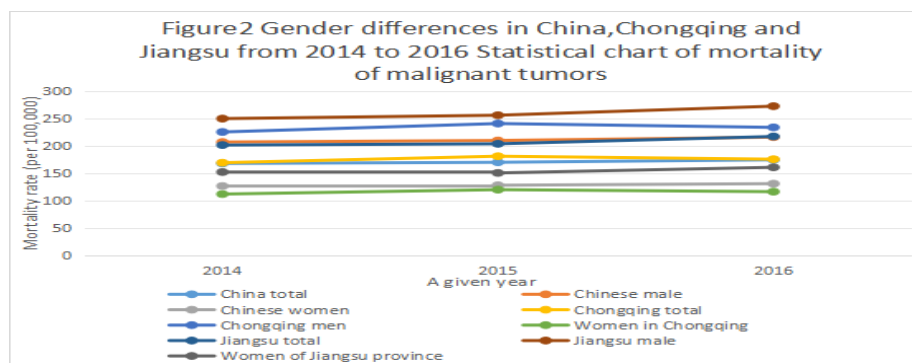


Figure 2. Mortality rate of malignant tumors in the Chongqing and Jiangsu provinces from 2014–2016

2.1. Incidence and death of major malignant tumors in Chongqing and Jiangsu Province from 2014–2016

The top 10 incidence and death rates of malignant tumors in Chongqing from 2014–2016 are shown in **Table 1**, and the top 10 incidence and death rates of malignant tumors in Jiangsu Province from 2014–2016 are shown in **Table 2**. This shows that the malignant tumors with the highest incidence in Chongqing and Jiangsu Province are lung cancer, and the malignant tumors with the 2nd to 10th incidence are liver cancer, stomach cancer, colorectal cancer, esophageal cancer, and other digestive system tumors. According to the national data, the malignant tumor with the highest incidence in China in 2016 was lung cancer (59.89/100,000), followed by colorectal cancer (29.51/100,000), gastric cancer (28.68/100,000), liver cancer (28.12/100,000), female breast cancer (45.37/100,000), esophageal cancer (18.26/100,000), thyroid cancer (14.65/100,000), cervical cancer (17.69/100,000), brain tumor (7.88/100,000), and pancreatic cancer (7.26/100,000) [3]. The incidence of breast cancer is the 5th to 6th malignant tumor in Chongqing (the 2nd in 2015), while the incidence of breast cancer in Jiangsu Province is the 6th. The difference is that the overall incidence of lung cancer in Chongqing was slightly higher than that in Jiangsu Province, and the incidence of liver cancer was higher in Chongqing, ranking 2nd to 4th, and the incidence was similar to that of liver cancer in Jiangsu Province. The incidence of gastric cancer and esophageal cancer ranked 4th to 7th in Chongqing, while the incidence of gastric cancer and esophageal cancer ranked 2nd to 3rd in Jiangsu Province, which was higher than that in Chongqing. Cervical cancer was the 6th to 7th most common malignant tumor in Chongqing and the 8th to 9th in Jiangsu Province. Pancreatic cancer was the 6th to 7th most common malignant tumor in Jiangsu Province, which is higher than that in Chongqing.

Table 1. Top 10 statistics on incidence and death of malignant tumors in Chongqing province from 2014–2016

	Incidence rate (per 100,000)			Mortality rate (per 100,000)		
	2014 [4]	2015 [5]	2016 [6]	2014 [4]	2015 [5]	2016 [6]
1	Lung cancer (62.11)	Lung cancer (68.17)	Lung cancer (71.82)	Lung cancer (60.76)	Lung cancer (60.87)	Lung cancer (59.38)
2	Colorectal cancer (26.82)	Breast cancer (31.48)	Liver cancer (35.00)	Liver cancer (34.04)	Liver cancer (28.84)	Liver cancer (29.19)
3	Liver cancer (22.90)	Colorectal cancer (28.32)	Colorectal cancer (29.17)	Carcinoma of the esophagus (16.89)	Carcinoma of the esophagus (16.39)	Carcinoma of the esophagus (17.54)
4	Carcinoma of the esophagus (17.79)	Liver cancer (27.68)	Carcinoma of the esophagus (22.96)	Gastric cancer (12.39)	Colorectal cancer (13.95)	Gastric cancer (15.41)
5	Breast cancer (15.78)	Carcinoma of the esophagus (21.19)	Gastric cancer (19.62)	Colorectal cancer (12.31)	Gastric cancer (13.92)	Colorectal cancer (12.76)
6	Gastric cancer (14.58)	Cervical cancer (18.29)	Breast cancer (16.84)	Unknown part (7.30)	Breast cancer (7.33)	Pancreatic cancer (5.01)
7	Unknown part (12.15)	Gastric cancer (16.47)	Cervical cancer (9.49)	Pancreatic cancer (4.39)	Pancreatic cancer (5.10)	Brain tumor (3.73)
8	Cervical cancer (7.34)	Prostate cancer (9.85)	Lymphoma (6.97)	Leukemia (3.76)	Leukemia (4.11)	Breast cancer (3.56)
9	Lymphoma (6.82)	Carcinoma of corpus uteri (7.49)	Thyroid cancer (6.30)	Lymphoma (3.39)	Brain tumor (3.56)	Leukemia (3.41)
10	Brain tumor (6.07)	Ovarian cancer (7.15)	Pancreatic cancer (6.21)	Brain tumor (3.25)	Lymphoma (3.54)	Cervical cancer (2.91)
Total	244.66	269.39	289.90	169.28	181.22	175.71

Table 2. Top 10 statistics of malignant tumor incidence and death in Jiangsu Province from 2014 to 2016

	Incidence rate (per 100,000)			Mortality rate (per 100,000)		
	2014 ^[7]	2015 ^[8]	2016 ^[9]	2014 ^[7]	2015 ^[8]	2016 ^[9]
1	Lung cancer (55.02)	Lung cancer (55.43)	Lung cancer (60.99)	Lung cancer (46.37)	Lung cancer (46.98)	Lung cancer (50.79)
2	Gastric cancer (44.05)	Gastric cancer (42.97)	Gastric cancer (46.35)	Gastric cancer (32.36)	Gastric cancer (32.37)	Gastric cancer (35.00)
3	Carcinoma of the esophagus (39.41)	Carcinoma of the esophagus (36.40)	Carcinoma of the esophagus (34.14)	Carcinoma of the esophagus (30.38)	Carcinoma of the esophagus (28.43)	Carcinoma of the esophagus (28.29)
4	Liver cancer (30.21)	Liver cancer (28.68)	Colorectal cancer (31.57)	Liver cancer (27.41)	Liver cancer (26.42)	Liver cancer (26.01)
5	Colorectal cancer (26.02)	Colorectal cancer (27.37)	Liver cancer (28.41)	Colorectal cancer (12.49)	Colorectal cancer (13.44)	Colorectal cancer (15.05)
6	Breast cancer (18.26)	Breast cancer (19.43)	Breast cancer (21.38)	Pancreatic cancer (8.88)	Pancreatic cancer (9.63)	Pancreatic cancer (10.74)
7	Pancreatic cancer (9.82)	Pancreatic cancer (9.80)	Pancreatic cancer (11.32)	Brain tumor (5.05)	Leukemia (4.80)	Lymphoma (5.11)
8	Cervical cancer (9.05)	Cervical cancer (8.67)	Thyroid cancer (9.73)	Leukemia (4.59)	Brain tumor (4.76)	Leukemia (5.09)
9	Brain tumor (7.28)	Thyroid cancer (7.52)	Cervical cancer (8.65)	Breast cancer (4.30)	Breast cancer (4.50)	Brain tumor (5.03)
10	Thyroid cancer (6.71)	Brain tumor (7.16)	Prostate cancer (7.97)	Lymphoma (4.20)	Lymphoma (4.35)	Breast cancer (4.86)
Total	304.96	305.80	327.48	201.72	204.00	217.44

3. Discussion

Chongqing City and Jiangsu Province are located in the west and east of China with relatively developed economies. It is crucial to reduce the negative impact on people's lives and health while promoting social progress through economic development. Smoking is an important risk factor for lung cancer. To effectively prevent and control the occurrence of malignant tumors such as lung cancer, China must make greater efforts to conduct tobacco control. In addition, lung cancer can be diagnosed and treated early ^[10]. The National Cancer Institute of the United States has shown that low-dose spiral CT can be used as a screening method for certain high-risk groups of lung cancer, which can significantly reduce the mortality rate of lung cancer by 20% ^[11,12]. Therefore, regular chest CT examinations for middle-aged and elderly people can screen and diagnose lung cancer patients early and improve their survival rate. Chronic viral hepatitis B is an important risk factor for liver cancer in China. The policy of hepatitis B vaccine for newborns still needs to be vigorously promoted ^[13]. Since 2005, Jiangsu Province has participated in the early cancer diagnosis and treatment program supported by the Central Government special fund (currently screening for esophageal cancer, stomach cancer, lung cancer, liver cancer, colorectal cancer, breast cancer, and cervical cancer) and achieved certain results ^[8]. In 2017, Chongqing began to implement the National Health Lifestyle Action Plan (2017–2025) jointly issued by the National Health and Family Planning Commission and other five departments, which proposed special actions such as three reductions and three health, moderate exercise, tobacco control and alcohol restriction, and mental health to resolve unhealthy lifestyles ^[6].

The top 10 malignant tumors in Chongqing and Jiangsu Province from 2014–2016 were pancreatic cancer, brain tumor, and leukemia^[14]. Pancreatic cancer was also ranked among the top 10 malignant tumors in Jiangsu Province and these three malignant tumors have a low survival rate and are difficult to detect early. Advances in medical technology have brought about improvements in treatment programs, such as the development of new technologies such as targeted therapies. These have brought hope for the treatment of tumors of the blood system such as leukemia^[15].

4. Conclusion

The incidence and mortality of malignant tumors in Chongqing, Jiangsu Province, and the whole country are gradually on the rise. The prevalence of malignant tumors such as lung cancer, colorectal cancer, breast cancer, and pancreatic cancer is increasing, while the prevalence of liver cancer, stomach cancer, and esophageal cancer is decreasing. However, in Chongqing, Jiangsu Province, and even the whole country, the prevention and control of malignant tumors is of priority. Therefore, the monitoring of malignant tumors, the implementation of prevention and control measures, and the progress of medical technology are important measures to reduce the harm of malignant tumors in China that should be widely implemented.

Disclosure statement

The authors declare no conflict of interest.

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