

MINI-REVIEW

Epidemiological Trends of Nasopharyngeal Carcinoma in China

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Abstract

Research papers and data concerning NPC epidemiology in China available worldwide were reviewed. It was found that although the results of three national all death-causes sampling surveys in China showed mortality rates in most sampling areas and all as overall to be declining continuously and remarkably, figures for 1987-2000 in some selected areas of China released by the World Health Organization were relatively stable, and the NPC incidence and mortality rates reported by Zhongshan and Sihui cities of Guangdong Province in China had shown ascending or stable trends, respectively. Differences with regard to change in NPC incidence and mortality rates over time may be caused by variation in the data quality from divergent sources, but the exact reasons clearly warrant further analysis.

Key words: Nasopharyngeal carcinoma - epidemiology - incidence and mortality trends in China

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Introduction

Recent research reports of NPC epidemiology worldwide have provided evidence that the incidence is changing in some countries and areas. For example, the incidence and mortality rates of NPC have decreased remarkably in Hongkong (Lee et al., 2003) and Taiwan (Hsu et al., 2006) and in Chinese migrants living in countries with a low risk of the disease, particularly in men (Yu and Hussain, 2009), but the incidence in Singapore Malaysians, in contrast, increased in 1968-1997 (Wang et al., 2004). The NPC epidemiological trend change may be influenced by the geographic and ethnic distribution, the Bidayuh in Sarawak of Malaysia being reported to have the highest NPC incidence worldwide in 1996-1998, even 50 percent higher than the Hongkong population during the corresponding period (Devi et al., 2004). Since Southern China is one of the places with the highest prevalence worldwide, it should be a focus in any attempt to see if the NPC epidemiological trend in China has changed or is remaining stable, as reported previously (Hong and Guo, 2006).

Chinese National Death-Causes Data

As of now, China had conducted three retrospective nationwide all death-causes sampling surveys in 1973-1975, 1990-1992 and 2004-2005. According to the three surveys results the NPC epidemiological status and trends

in China could be analyzed since all the cancer death causes were also included in the surveys. The results showed China NPC mortality rates to have decreased continuously and remarkably (see Table 1). As reported earlier by Dai et al (1999) the NPC crude, China and world age-adjusted mortality rates of all sampling areas in 1990-1992 in China had decreased 25.0%, 34.6% and 33.8% respectively, the male and female world age-adjusted mortality rates down 30.6% and 41.4% respectively, the urban and rural sampling areas world age-adjusted mortality rates down 39.0% and 32.6% respectively compared with those of 1973-1975. Except for the male NPC mortality rates of Tianjin, Shanghai, Guizhou, Gansu and the female

Table 1. Change of NPC Mortality and Proportions in the Three National Death-Causes Surveys

Comparison	2004-2005 and 1990-1992			2004-2005 and 1973-1975		
	Mort	ADR	Prop	Mort	ADR	Prop
Areas						
All areas	-16.1	-34.0	-0.54	-26.6	-49.5	-1.61
Urban areas	-17.6	-34.2	-0.65	-19.7	-50.0	-1.34
Rural areas	-16.8	-34.0	-0.48	-29.8	-49.5	-1.70
Canton						
Zhongshan	-11.7	-33.7	-7.22	-16.8	-43.6	-11.3
Sihui	-0.98	-11.0	-0.54	-15.7	-31.5	-14.4

Mort, mortality; ADR, Chinese Age-Adjusted Rate; Prop, Proportion. Data come from the Report of the Third National Retrospective All Death -Causes Sampling Survey published by the National Health Department of China

mortality rates of Shanghai, Guangxi, Guizhou and Gansu with rising trend (Gansu up more than 200 percent, the place with the greatest increase), most sampling areas had witnessed a drop in NPC mortality. Besides, the NPC mortality rates of high-risk areas such as Guangdong and Guangxi Province, down 13.5% and 2.9% respectively, did not decrease so markedly as compared with those in low-risk areas such as northeast and northern areas of China (down 50%-60%) (Di et al., 1997; Dai et al., 1998).

The results of the third national death-causes sampling survey in China also revealed that the NPC mortality rate of all sampling areas as a whole had decreased steadily and obviously, with its China age-adjusted mortality rate down 49.5% and 34.0% respectively compared with the rates of the first and second survey. The rates of urban and rural sampling areas also had down differently, with the urban areas rates down more evidently. Further, the NPC mortality rates of Zhongshan and Sihui cities of Canton in China in 2004-2005, both with the highest NPC incidences in China, also dropped with Zhongshan more obviously (Table 1) (Cheng, 2008).

Chinese National Cancer Prevention and Treatment Data

Until now, the National Cancer Prevention and Treatment Office of China had published three cancer reports, which are: The Cancer Incidence and Mortality of Pilot Cities and Counties in China (1988-1992), The Cancer Incidence and Mortality of Pilot Cities and

Counties in China (1993-1997) and China Annual Cancer Report 2004 respectively. The data of some cancer registries of China were included in all three reports, so we could investigate their cancer incidence and mortality trends accordingly.

In 1988-2004, the NPC incidence rates of some cancer registries in China, such as the male rates of Linju county of Shangdong province (up 100%), Jiashang city of Jiangsu province, Changle city of Fujian Province and the female rates of Cixian county of Hebei Province, Linzhou county of Henan province (up 110%), Linju county of Shangdong province (up 103.3%) and Fusui county of Guangxi province, had ascended differently. However, at the same time, in some cancer registries NPC incidence rates, such as the male rates for Tianjin, Wuhan city of Hubei province, Cixian county of Hebei Province (down 50.7%), Fusui county of Guangxi province, Linzhou county of Henan province (down 71.1%) and the female rates for Shanghai, Tianjin, Wuhan city of Hubei province (down 54.9%) and Changle city of Fujian Province, had descended with different levels (Table 2) (National Cancer Prevention and Treatment Office, 2001; 2008a; 2008b).

World Health Organization Data

The World Health Organization has been promulgating the NPC world age-adjusted mortality rates for selected areas of China (available at the website <http://www-dep.iarc.fr>), and rates have remained relatively stable, independent of whether urban or rural, male or female

Table 2. NPC Incidence Rates of Some Cancer Registries in China during Different Periods

Areas	1988-1992			1993-1997			2004		
	CR	C-ADR	W-ADR	CR	C-ADR	W-ADR	CR	C-ADR	W-ADR
Males									
Harbin	1.5	1.3	1.8	1.6	1.3	1.6	2.11	1.33	1.70
Beijing	1.3	0.9	1.1	1.2	0.8	1.0	1.81	1.07	1.28
Tianjin	1.8	1.3	1.6	2.0	1.3	1.6	1.42	0.80	0.98
Shanghai	5.5	3.7	4.5	5.8	3.4	4.3	7.84	3.78	4.72
Wuhan	4.7	3.7	4.8	4.3	3.2	4.0	3.31	2.13	2.64
Cixian	1.4	1.8	2.8	0.5	0.6	0.6	1.29	1.28	1.38
Linzhou	0.3	0.5	0.9	0.2	0.2	0.3	0.20	0.22	0.26
Linju				0.7	0.7	0.8	1.72	1.08	1.40
Qidong	2.0	1.5	1.9	1.8	1.4	1.7	2.67	1.53	1.72
Jiashang	4.4	3.1	3.9	4.1	2.6	3.3	7.38	3.52	4.45
Changle	5.4	5.9	7.3	7.1	7.0	8.7	8.32	6.62	8.14
Fusui	6.5	7.1	8.8	7.2	8.1	9.9	5.46	4.90	5.48
Females									
Haerbin	0.9	0.6	0.8	0.7	0.5	0.6	1.29	0.70	0.99
Beijing	0.6	0.4	0.5	0.8	0.5	0.6	0.30	0.32	0.43
Tianjin	0.8	0.5	0.6	0.8	0.4	0.5	0.58	0.29	0.37
Shanghai	2.2	1.5	1.8	2.3	1.3	1.6	2.18	1.11	1.30
Wuhan	2.3	1.7	2.2	2.1	1.5	1.8	1.41	0.86	1.01
Cixian	0.3	0.3	0.5	0.5	0.4	0.5	1.02	0.84	0.89
Linzhou	0.3	0.3	0.3	0.1	0.1	0.1	0.62	0.50	0.63
Linju				0.3	0.2	0.2	0.76	0.45	0.61
Qidong	1.4	0.8	1.1	0.9	0.6	0.8	1.74	0.98	1.15
Jiashang	1.9	1.3	1.7	2.0	1.1	1.6	1.57	0.76	0.99
Changle	2.6	2.6	3.3	3.0	2.7	3.3	2.25	1.72	1.83
Fusui	2.5	2.4	3.0	2.4	2.1	2.6	4.07	3.45	4.40

CR, Crude incidence rate; C-ADR, China Age-Adjusted Rate; W-ADR, World Age-Adjusted Rate. Data are from the reports of The Cancer Incidence and Mortality of Pilot Cities and Counties in China (1988-1992), The Cancer Incidence and Mortality of Pilot Cities and Counties in China (1993-1997) and the China Annual Cancer Report 2004

Table 3. The NPC World Age-Adjusted Mortality Rates of Selected Areas in China in 1987-2000

Year	Rural Areas		Urban Areas	
	Male	Female	Male	Female
1987	2.96	1.14	2.55	1.31
1988	2.49	1.19	2.48	1.13
1989	2.17	1.21	2.81	1.19
1990	2.23	0.91	2.95	1.19
1991	2.43	1.21	2.88	1.16
1992	2.59	1.05	2.98	1.14
1993	2.72	1.12	2.74	1.15
1994	2.43	1.18	2.68	1.03
1995	2.46	1.04	2.82	1.08
1996	2.09	0.91	2.88	0.97
1997	2.47	1.19	2.51	1.14
1998	2.52	1.14	2.37	1.03
1999	2.48	1.17	2.37	0.80
2000	2.48	1.14	2.55	1.06

Data are /100,000 from the WHO website <http://www-dep.iarc.fr/>. (see Table 3).

Literature Review

Jin et al (1999a; 1999b) earlier reported that the NPC mortality and incidence rates of Shanghai in 1972-1994 had both declined over the 23 years period. In contrast, Jia et al (2006) documented findings for Sihui city of Canton in 1978-2002 and Canwu county of Guangxi in 1983-1997 and described their NPC incidence and mortality rates to be stable, except for female Sihui mortality rate decreasing 6.3% and the male Canwu incidence rising 3.6%. Huang et al (2005) also covered the period of 1987-1991, and reported the NPC incidence rates of Sihui city in Canton of China to be stable in 1997-2001. However, the NPC world age-adjusted incidence rates in Zhongshan of Canton rose from $14.0/10^5$ in 1970 to $17.0/10^5$ in 1999, up 21.4% over 30 years, and the mortality rate climbed from $10.2/10^5$ in 1972 to $14.5/10^5$ in 1999, up 44.3% in 27 years (Wei et al., 2001; 2003). Lu et al (2001) similarly noted that the male NPC China- age-adjusted mortality rates of Henan province rose from $1.4/10^5$ in 1974-1976 to $2.13/10^5$ in 1997-1999, and the female rates rose from $0.79/10^5$ to $1.21/10^5$. Qi et al (2005) also covered that the NPC mortality rates of Henan province increased from $0.78/10^5$ in 1984-1988 to $1.72/10^5$ in 1994-1998, a 1.21 fold change, and after that it began to fall.

However, Dai et al (1999) reported that the male and female NPC mortality rates of Henan province in the second national death-causes sampling survey had dropped 56.8%, and 62.8% respectively compared with the rate of the first survey. There are thus disparities among the above presented rates, especially between the NPC mortality rates reported by the registries with high NPC incidence rates such as Zhongshan and Sihui registries and by the national death-causes sampling surveys. It is clearly necessary that we analyze the reasons further. One source of confusion might be the histopathological diagnosis. The overall decline in incidence rate of nasopharyngeal carcinoma in Hong Kong during 1988-2002 was found to be limited primarily to a decrease in keratinising carcinoma, which could be explained by the decline in cigarette smoking

(Tse et al., 2006). Diet is a major influence and change in this and other lifestyle elements appears to be behind some of the declining incidence over time (Luo et al., 2007).

Conclusions

Although the data from the national death-causes sampling surveys displayed that most sampling areas and all as a whole had dropped obviously and continuously, there is disagreement among the data from the National Cancer Prevention and Treatment Office, WHO and other sources. Some areas such as Zhongshan city of Canton, Linju of Jiangsu Province and Henan Province witnessed their NPC mortality and incidence increasing, but some areas such as Sihui city of Canton and Canwu of Guangxi stable. Variation in data quality may be one cause, but the exact reasons warrant further analysis.

References

- Cheng Z (2008). Report on the Third National Retrospective Death-Causes Sampling Survey. Beijing: Peking Union Medical College Press, 31-40.
- Dai X-D, Li L-D, Lu F-Z, et al (1998). Analysis on the mortality characteristics of nasopharyngeal carcinoma in China in 1990-1992. *Shi Yong Zhong Liu Xue Za Zhi*, **12**, 81-4 (in Chinese).
- Dai X-D, Li L-D, Lu F-Z, et al (1999). Trend of China nasopharyngeal carcinoma in 20 years and its prediction in the near future. *Shi Yong Zhong Liu Xue Za Zhi*, **13**, 1-5 (in Chinese).
- Devi BC, Pisani P, Tang TS, Parkin DM (2004). High incidence of nasopharyngeal carcinoma in native people of Sarawak, Borneo Island. *Cancer Epidemiol Biomarkers Prev*, **13**, 482-6.
- Huang Q-H, Lin Q-N, Li Y-H, et al (2005). Dynamic analysis on cancer incidence of Sihui City. *Zhong Guo Zhong Liu Za Zhi*, **14**, 241-3 (in Chinese).
- Hong M-H, Guo X (2003). Nasopharyngeal Carcinoma. Beijing: China Medical Technological Press, 16.
- Hsu C, Shen YC, Cheng CC, et al (2006). Difference in the incidence trend of nasopharyngeal and oropharyngeal carcinomas in Taiwan: implication from age-period-cohort analysis. *Cancer Epidemiol Biomarkers Prev*, **15**, 856-61.
- Jia WH, Huang QH, Liao J, et al (2006). Trends in incidence and mortality of nasopharyngeal carcinoma over a 20-25 year period (1978/1983-2002) in Sihui and Cangwu counties in southern China. *BMC Cancer*, **6**, 178.
- Jin F, Zhou S-Z, Tao R-F, Fang R-R, et al (1999a). Cancer incidence trends in urban Shanghai, 1972-1994. *Zhong Guo Zhong Liu Za Zhi*, **19**, 255-8 (in Chinese).
- Jin F, Devesa SS, Zheng W, et al (1999b). Cancer incidence trends in urban Shanghai, 1972-1994: An update. *Int J Cancer*, **83**, 435-40.
- Lee AW, Foo W, Mang O, et al (2003). Changing epidemiology of nasopharyngeal carcinoma in Hong Kong over a 20-year period (1980-99): an encouraging reduction in both incidence and mortality. *Int J Cancer*, **103**, 680-5.
- Li L-D, Zhang S-W, Lu F-Z (1997). Malignant tumor death sequence and its character of classification and proportion in China. *Zhong Guo Zhong Liu Za Zhi*, **19**, 323-8 (in Chinese).

- Lu J-B, Zu S-K, Sun X-B, et al (2001). Analysis on the common cancer mortality and its epidemiological trends of Henan Province residents (1974-1999). *He Nan Yi Xue Yan Jue*, **10**, 267-71 (in Chinese).
- Luo J, Chia KS, Chia SE, et al (2007). Secular trends of nasopharyngeal carcinoma incidence in Singapore, Hong Kong and Los Angeles Chinese populations, 1973-1997. *Eur J Epidemiol*, **22**, 513-21.
- National Cancer Prevention and Treatment Office of Ministry of Health of China (1979). Malignant tumor mortality survey in China. Beijing: the Peoples Health Press, 224-249.
- National Cancer Prevention and Treatment Office (2001). The Health Statistics Information Center of Ministry of Health of China. The Cancer Incidence and Mortality of Pilot Cities and Counties in China (1993-1997). Beijing: China Medicine Scientific Press, , 113-54.
- National Cancer Prevention and Treatment Office (2008a), The Health Statistics Information Center of Ministry of Health of China. The Cancer Incidence and Mortality of Pilot Cities and Counties in China (1993-1997). Beijing: China Medicine Scientific Press,106-53.
- National Cancer Prevention and Treatment Office (2008b). The National Cancer Registry Center, The Disease Prevention and Control Bureau of Ministry of Health of China. China Cancer Registry Report 2004. Beijing: Peking Union Medical College Press,137-243.
- Qi J-X, Wang J-H, Sun X-B, et al (2005). Mortality analysis of nasopharyngeal carcinoma in Henan Province in 1984-2003. *Zhong Guo Zhong Liu Za Zhi*, **14**, 367-8 (in Chinese).
- Tse LA, Yu IT, Mang OW, Wong SL (2006). Incidence rate trends of histological subtypes of nasopharyngeal carcinoma in Hong Kong. *Br J Cancer*, **95**, 1269-73.
- Wang H, Seow A, Lee HP. Trends in cancer incidence among Singapore Malays: a low-risk population. *Ann Acad Med Singapore* 2004;**33**:57–62.
- Wei K-R, Liang Z-H, Liu X-H,Zheng W-B, Lin M-H (2003). TITLE?? *Shi Yong Yu Fang Yi Xue*, **10**, 295-7 (in Chinese).
- Wei K-R, Liu Q, Wang D-K, et al (2001). The incidence of nasopharyngeal carcinoma and its prediction in the near future in Zhongshan in 1970-1999. *Ai Zheng*, **20**, 1065-8 (in Chinese).
- Yu WM, Hussain SS (2009). Incidence of nasopharyngeal carcinoma in Chinese immigrants, compared with Chinese in China and South East Asia: review. *J Laryngol Otol*, **123**, 1067-74.