

Nutrition-related disease and death in Zhejiang Province

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In Zhejiang province economic development and changes in nutrition appear to have increased both life expectancy and nutrition-related chronic disease morbidity. Life expectancy is longer in urban populations than in rural and in both urban and rural females. From 1997 to 2002 urban females had an average life expectancy of 81.4 years. In 2002 the estimated incidence of ischaemic heart disease was higher in rural males and females whereas diabetes mellitus was higher in urban males and females. From 1990 to 2002 lung cancer had large increases in all groups, cancers of the oesophagus and stomach increased in rural males and females, and cancer of the large intestine increased 40 per cent in urban males. In 2002 deaths from cerebrovascular disease were much higher in rural males and females. Apart from differences in lifestyle factors between urban and rural, access to medical resources may also be relevant to the differences within the province in chronic disease rates and in life expectancy.

Key Words: death rate, urban, rural, life expectancy, nutrition related disease, Zhejiang Province, China

Introduction

With economic development and generally improved nutrition, life expectancy in China has continued to increase. But at the same time, chronic diseases are also increasing in the population, e.g. diabetes, coronary heart disease, hypertension, stroke and malignant tumors. This paper reports recent estimates of life expectancy in Zhejiang province together with morbidity and mortality data collected by the Zhejiang Provincial Center for Disease Control and Prevention.

Sources of data and methods of analysis

Disease data are from two sources. The first are reports to the Provincial Center for Disease Control and Prevention of deaths in 1.62 million population clustered around 20 monitoring points selected in a random sample, stratified by urban and rural residence, throughout Zhejiang province. Cause of death was coded to ICD-9 for the years 1990-2001. The second is the first year of a quality control survey of hospital consultations and admissions in Zhejiang province in 2002 among a stratified random sample of 3.65 million persons of all ages clustered around 30 monitoring points. A survey form was used to record diseases newly diagnosed by hospitals. Acute ischaemic heart disease diagnoses were recorded as incident cases if repeat diagnoses were separated by 28 days or more. ICD10^{1,2} was used to code morbidity for 2002.

Unadjusted disease specific death rates were calculated for 2002 for oesophagus (ICD C15), stomach (C16), large intestine (C18 to C20) and liver (C22), lung (C33-C34) and breast (C50) cancers; and for acute myocardial infarction (I21), chronic ischaemic heart disease (I25) and cerebro-

vascular disease (I60-I69). Crude incidence rates were calculated for 2002 for diabetes mellitus (ICD E10 to E14), and for acute ischaemic heart disease (ICD I21 to I24). Average tumor death rates in 1990-1992 and 2000-2002 were age-adjusted to the population census of Zhejiang province in 1990 for the above with additional codes: all malignant neoplasms (C00 to C99), leukaemia (C91 to C95), cervix uteri (C53), nasopharynx (C11) and bladder (C67). SPSS10.0 and Excel2002 were used in analysis.

Death rates in 2002 in urban and rural populations

Table 1, based on data from disease surveillance sites, shows higher death rates from oesophageal and stomach cancer and cerebrovascular disease in rural males and females, whereas cancers of the large intestine and lung are higher in urban males and females.

Incidence of diabetes and acute ischaemic heart disease

In 2002 the incidence of diabetes (Table 2) in urban areas of Zhejiang province was 67.64 in males and 68.12 in females per 100,000, significantly higher than in rural areas. In contrast, the incidence of acute ischaemic heart disease was considerably higher in males and females in rural areas than urban (Table 2).

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Table 1. Unadjusted death rates in urban and rural samples in Zhejiang Province in 2002, per 100,000

Disease	Urban		Rural	
	Male	Female	Male	Female
Oesophagus cancer	7.0	4.6	21.5	7.87
Stomach cancer	32.0	15.5	46.6	22.05
Large intestine cancer	18.3	8.8	11.7	7.87
Primary liver cancer	46.5	12.8	48.6	17.46
Lung cancer	69.8	26.8	50.8	17.98
Breast cancer	0.3	4.6	0.1	3.28
Acute myocardial infarction	19.2	15.2	17.8	13.12
Coronary heart disease	18.0	20.1	16.9	17.86
Cerebrovascular disease	96.8	91.8	133.1	119.57

Source: data from Zhejiang 30 monitoring points

Table 2. Estimated incidence of diabetes and ischaemic heart disease in Zhejiang Province in 2002 per 100,000

	Urban	Rural	Total
Diabetes			
Men	67.6	36.2	49.1
Women	68.1	52.2	58.8
Total	67.9	44.0	54.0
IHD			
Men	88.3	106.4	99.6
Women	55.9	87.5	75.3
Total	72.7	97.0	87.7

Source: data from Zhejiang 30 monitoring points

Trends in death rates from malignant neoplasms

Age adjusted death rates for the years 1990-1992 and 2000-2002 are compared in Table 3. Death rates for total malignant neoplasms increased slightly for males and females in urban areas (respectively rising 5.8% and 3.9%). Increases were larger in rural areas with increases in males and females of 27.5% and 22.2% respectively. Although the highest death rates for cancer are for the lung in urban males, death rates increased in all four male/female urban/rural groups with the largest relative increases in urban (57.4%) and rural (55.4%) females. The absolute increases in lung cancer are greater than those for other sites.

Oesophagus and stomach cancers decreased in urban males and females, but increased in rural areas. Stomach has become the most frequent site of cancer in rural areas, but is being overtaken by lung cancer. Liver cancer is also common throughout the province with non-significant trends. Cancer of the large intestine has increased in urban and rural males, but decreased by 20.6% in urban females.

From a low base, deaths from nasopharynx cancer decreased throughout the province, but breast cancer deaths, also from a low base, increased 22% and 24% in urban and rural women respectively. Urban rates of breast cancer are twice those of rural. Death rates from

bladder cancer are low and showed small changes - decreases in urban areas and increases in rural. Death rate from leukaemia had small urban increases but were comparatively stable in rural areas.

Life expectancy in Zhejiang Province

Population life expectancy in Zhejiang province from 1997 to 2002 is presented in Table 4. It can be seen that urban females consistently had the highest life expectancy, and rural males the lowest. Urban males were second highest in all years except 2002.^{3,4} During the 6 years life expectancy of urban females was on average 81.4 years.

Discussion

The total average population life expectancy in Zhejiang province from 1997 to 2002 is between 73.6 and 75.6. But the life expectancy in urban areas is nearly 80 years - this is lower than Japan, Australia and the European Union, but higher than the world average.^{3,5}

We found great variation in reported rates of chronic diseases among surveillance sites throughout Zhejiang province. Thus among 30 surveillance sites in 2002 diabetes rates ranged from 6.8 to 223.9 per 100,000 with 3 areas above 100. The average for the whole province was 54.0. There is little information about the prevalence of diabetes in China. In USA, the prevalence of diabetes among people aged 20 years or more is 8.7% in both males and females, and 6.3% for all ages combined.^{6,7}

Reported occurrence of CHD ranged from 5.0 to 178.0 per 100,000. The average incidence rate is 87.7 per 100,000, well below the occurrence rate of acute CHD of 144 per 100,000 recorded by the Zhejiang office of Heart and Brain Disease Prevention and Treatment suggesting that there may have been under-reporting in the first year of morbidity surveillance.

Cancer accounts for 25% of deaths in Zhejiang. Age-adjusted death rates have increased in the past decade, principally due to increased lung cancer deaths, most of which are in males and attributable to smoking and thus preventable. But a substantial proportion of lung cancer in some female Chinese populations is not attributable to

Table 3. Trends in age-adjusted death rates per 100,000 from malignant neoplasms, in urban and rural populations of Zhejiang province, 1990 to 2002

Malignant Neoplasms	1990-1992				2000-2002			
	Urban		Rural		Urban		Rural	
	Male	Female	Male	Female	Male	Female	Male	Female
Total	184.3	104.2	159.7	81.1	194.9	108.3	193.7	99.0
Lung	46.5	17.5	30.1	9.9	63.2	27.5	43.8	15.6
Esophagus	12.9	3.9	14.3	4.9	7.7	2.6	17.2	6.7
Stomach	35.5	20.8	41.3	19.7	28.6	14.5	45.7	21.4
Liver	39.1	14.5	41.4	16.8	36.3	13.9	45.7	15.7
Large intestines	10.3	9.6	7.3	5.6	14.3	7.6	9.1	7.5
Leukemia	4.4	2.9	4.7	3.4	5.3	3.1	4.5	3.4
Breast	-	6.6	-	2.7	-	8.0	-	3.4
Uterine cervix	-	2.4	-	3.7	-	1.3	-	3.0
Nasopharynx	3.3	1.4	2.3	0.9	1.8	0.9	2.3	1.1
Bladder	2.8	1.2	1.8	0.5	2.7	0.8	2.5	0.7

Table 4. Population life expectancy in Zhejiang Province from 1997 to 2002

year	Total average			Urban			Rural		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
1997	73.6	72.0	76.2	79.7	77.6	81.9	71.7	69.3	74.6
1998	73.7	71.5	76.3	79.1	77.6	80.6	72.0	69.6	74.9
1999	74.3	72.5	76.4	80.6	78.9	82.2	72.4	70.5	74.6
2000	74.9	72.8	77.2	78.0	76.4	79.8	73.7	71.6	76.3
2001	75.6	73.4	77.9	81.9	80.1	83.7	74.4	72.2	76.9
2002	75.5	74.3	76.9	77.4	74.9	80.2	74.7	72.5	77.5

adopted from Zhejiang health statistic annals, 2003³

smoking and is the subject of current investigations of aerosols from oils heated in cooking. Primary liver cancer is also a major cause of cancer death, and is also largely preventable. Deaths from stomach cancer have fallen in urban, but not in rural areas. This might in part be a result of increased availability of refrigeration in urban areas. In addition, current research on helicobacter infections suggests that stomach cancer may also be preventable. Cancer of the large intestine is increasing, especially in urban males, and suggests that the very high rates in Chinese migrants to Hawaii and Los Angeles as a result of dietary change may also occur in China in the future.

In Zhejiang, lifestyle changes associated with rapid economic development and improvement of living standards, as well as population ageing have changed the relative frequency of causes of death. Malignant tumours have become an important cause of death in our province. Many factors can increase mortality rates of malignant tumors including heredity and environment, an ageing population, and the control of communicable diseases. Increased diagnosis is also a factor with increased access to medical and sanitary services.

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浙江省与营养有关的疾病和死亡率

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随着浙江省经济的发展，营养的改善，使得人群的期望寿命和营养相关慢性病的患病率都有所增加。城市人群中期望寿命要比农村人群高，1997-2002年城市女性的人均期望寿命达81.4岁。2002年心血管系统在农村人群中的发病率要比城市人群高，而糖尿病的发病率则相反。所有人群中，1990-2002年的肺癌发病率有较大的增加，在农村人群中食道癌、胃癌有所增加，城市人群中大肠癌的发病率增加了约40%。2002年脑血管疾病的死亡率在农村人群中较高。城市和农村的这些差别，除了生活方式不同引起外，能否获得适时的医疗保健服务也是造成省内慢性病发病率和期望寿命有差别的原因。

In Zhejiang province economic development and changes in nutrition appear to have increased both life expectancy and nutrition-related chronic disease morbidity. Life expectancy is longer in urban populations than in rural and in both urban and rural females. From 1997 to 2002 urban females had an average life expectancy of 81.4 years. In 2002 the estimated incidence of ischaemic heart disease was higher in rural males and females whereas diabetes mellitus was higher in urban males and females. From 1990 to 2002 lung cancer had large increases in all groups, cancers of the oesophagus and stomach increased in rural males and females, and cancer of the large intestine increased 40 per cent in urban males. In 2002 deaths from cerebrovascular disease were much higher in rural males and females. Apart from differences in lifestyle factors between urban and rural, access to medical resources may also be relevant to the differences within the province in chronic disease rates and in life expectancy.

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