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Review Article

Current status of gynecological cancer in China

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The aim of this review is to examine the current status of gynecological cancer in China focusing on epidemiological data. Epidemiological data on gynecological cancer in China is sparse. Therefore, most of the data were estimated via extrapolation based on a few available datasets. Cervical cancer is relatively rare and the incidence and mortality rate are largely decreasing. However, in young women, the incidence and mortality rates are increasing. The overall and age-specific incidence rates of cervical cancer appear to be varied according to geographical areas. The overall prevalence rate of human papillomavirus (HPV) in China is similar with other eastern Asian countries, but the age-specific HPV prevalence showed sustained high HPV prevalence rates in elderly women. There is not yet an established national program for cervical cancer prevention. The incidence rate of corpus and ovarian cancers in China slightly increased between 2000 and 2005, but is still lower than Japan or Korea. There is no reliable, national-level data on mortality rates of corpus and ovarian cancer in China. Breast cancer is one of the most rapidly increasing cancers in China. The increase was sharper in young women than in elderly women. Both increased risk and change of population size/structure contributed to the increase of breast cancer.

Key Words: Uterine cervical neoplasm, Endometrial neoplasm, Ovarian neoplasm, Breast neoplasm, China, Epidemiology

INTRODUCTION

Cancer is the major cause of death in developed and developing countries. In 2002, there were an estimated 10,864,499 new cancer cases worldwide and 44.9% (N=4,878,952) of cases ocurred in Asia. In addition, the mortality rate and the number of 5-year prevalent cancer cases were highest in Asia.[1] Therefore, the estimation of cancer burden in Asia would be an important issue.

In spite of geographical proximity, countries in Asia showed significant disparities in cancer incidence and mortality. For example, worldwide, China and Japan has the highest incidence rates for liver cancer, but the countries in south central Asia reported the lowest incidence rate for liver cancer.[2] Therefore, the cancer burden in neighboring countries in Asia is worth investigating. Especially, the cancer burden of China is noteworthy because of its huge population and dramatic change of population and social structures. For example, there are about 500,000 new cervical carcinoma cases worldwide and about 131,500 cases in China (29%).[3]

The aim of this review was to examine the current status of gynecological cancer in China focusing on the epidemiological data.

DEMOGRAPHY AND GENERAL HEALTH STATUS IN CHINA

China has nearly a quarter of the world population. Recent economic, social, and political changes in addition to demographic transition such as decreasing birth rates and increasingly elderly population are creating new challenges to the health care system in China. In addition, rapid economic growth resulted in huge inequalities between eastern and western China, rich and poor, urban and rural populations.

Over half of the population lives in rural areas. Life expectancy is similar or is slightly lower than that of developed countries, but infant and under-five year of age mortality rates remain high, especially in areas where access to medical services is difficult (Table 1).[4]

Disease burden has largely shifted from communicable to non-communicable diseases. For example, the leading causes of death in 2002 include cerebrovascular disease, heart disease and cancer. However, communicable diseases and malnutrition is still a major problem, especially in less developed areas.[4]

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Table 1. Demography of China

Demography	Year	Value
Total population	2005	1,315,844,000
% under 15	2005	21
Population distribution % rural	2005	59
Life expectancy, male	2004	70
Life expectancy, female	2004	74
Under-5 mortality rate per 1,000	2004	25
Maternal mortality ratio per 100,000 live births	2003	48
Gross National Income per capita US$	2004	1,290

CANCER DATABASE

Information on cancer incidence and mortality in China is rather sparse. There are several small population-based cancer registries located in big cities, relatively developed areas, and in some high-risk areas for certain cancer, but national-level data is very rare.[5] Therefore, most of the cancer-related, epidemiological data in China were estimated via extrapolation based on a few available datasets. The available datasets are as follows.

1) National mortality survey in 1973-1975 and in 1990-1992
2) National mortality reporting system: Center for Health Information and Statistics (CHIS)
3) National mortality reporting system: Disease Surveillance Points (DSP)
4) Population-based cancer registries

National mortality survey during 1990-1992 included random 10% samples of the Chinese population.[6] It is the most well-formulated dataset to estimate the national-level cancer-related mortality, and is used as the basal dataset for many epidemiological studies.

CHIS is the most comprehensive dataset on mortality in China. It is based on continuing surveillance system involving 36 cities and 85 counties. CHIS covers a population of about 100-120 million (10% of the Chinese population), and is used by the World Health Organization (WHO) to report mortality rates for the urban and rural populations of China.[7] However, the covered areas of CHIS do not represent a random sample of the Chinese population, but are located in the more easily accessible cities and counties on the eastern seaboard where vital statistics systems are relatively well established.[7]

DSP is similar to CHIS. However, in a comparison study of the mortality rates from CHIS and DSP datasets, authors concluded that the CHIS probably provides a better estimate of national cancer mortality rates than the DSP system.[6]

In a survey of Chinese cancer registration practices in 2002, 48 population-based cancer registries were identified.[8] The registries produce statistics on the incidence and outcome of cancer in a defined population. However, the registries covered only 5.7% of the Chinese population and were mostly located in the big cities, relatively developed areas, and in some high-risk areas for certain cancers. Many of the registries were established recently and substantial variations in data quality exist.[5]

Table 2. Incidence and mortality rate (per 100,000) of gynecological cancer in Eastern Asia

Cancer	Country	Incidence		Mortality	
		Crude rate	ASR	Crude rate	ASR
Cervix	China	7.3	6.8	4.1	3.8
	Japan	12	8	5.5	2.8
	Korea	21.1	17.9	5.7	4.7
Corpus	China	2.2	2	0.4	0.4
	Japan	9.1	6.1	2.9	1.3
	Korea	2	1.7	0.3	0.3
Ovary	China	3.4	3.2	1.6	1.5
	Japan	10.1	6.4	6.6	3.5
	Korea	6.6	5.7	2.3	1.9
Breast	China	20.1	18.7	5.8	5.5
	Japan	49.6	32.7	14.1	8.3
	Korea	23.5	20.4	5.1	4.4

ASR: age-standardized rate

GYNAECOLOGICAL CANCER

1. Cervical cancer

According to the GLOBOCAN 2002 database,[9] the incidence and mortality rates of cervical cancer in China are lower than those of Japan and Korea. Specifically, the age-standardized incidence rate of China is only one-third of the Korean rate. However, the difference in mortality rate is less pronounced than the difference in the incidence rate (Table 2).

There are no direct data on national cervical cancer incidence in China. Instead, estimates of cervical cancer incidence were calculated using the national mortality survey at 1990-1992, CHIS dataset, and population-based cancer registry dataset in a study. To explain further, authors estimated the national mortality rates by applying the trend of mortality rates calculated from CHIS dataset to National mortality survey dataset at 1990-1992. Then, they estimated the national cancer incidence rates by multiplying the estimated national mortality rates by the incidence/mortality ratios, which were extracted from five population-based cancer registries (Beijing, Shanghai, Wuhan, Qidong, and Jiashan).[5]

Age-specific and age-standardized incidence rates (per 100,000) and cumulative risks (0-74 years) of cervical cancer in 2000 and 2005 are summarized in Table 3. The cumulative risk was the chance by which an individual would develop the cancer in question before the age of 75 in the absence of other causes of death. Between 2000 and 2005, the overall incidence of cervical cancer slightly decreased, but the incidence in the young age group increased. Although the incidence of cervical

Table 3. Estimated age-specific and age-standardized incidence rates (per 100,000) and cumulative risks of gynecological cancer in 2000 and 2005

Cancer	Year	Age-specific rate					ASR	Cumulative risk
		0-44	44-54	55-64	65-74	75		
Cervix	2000	2.5	22.8	16.1	17.9	14.6	6.8	0.7
	2005	3.1	25.8	12.9	12.4	10.3	7	0.6
Corpus	2000	0.5	6.4	7.3	6.4	3.4	2	0.2
	2005	0.5	6.9	7.2	7.2	3.9	2.2	0.2
Ovary	2000	1.5	8.5	7.9	10	7.4	3.4	0.3
	2005	1.6	9.2	7.7	11.2	8.3	3.6	0.4
Breast	2000	9.2	59.6	50.6	37.3	29.7	19.9	1.9
	2005	11.6	78.7	61.4	42.4	30.2	24.8	2.3

Table 4. Age-specific and age-standardized cervical and breast cancer mortality rates (per 100,000) for year 1991, 2000 and 2005

Cancer	Year	Age-specific rate (ASR)					ASR
		15-44	45-54	55-64	65-74	75	
Cervix	1991	0.9	7.8	13.9	26.1	28.5	4.2
	2000	1.2	10	9.4	14	15.4	3.4
	2005	1.4	11.3	7.5	9.7	10.9	3.2
Breast	1991	1.6	9.2	12.5	14.4	20.8	3.8
	2000	2.4	15.2	17.9	18.3	20.2	5.5
	2005	3	20.1	21.8	20.8	20.5	6.7

cancer slightly decreased, the estimated number of cases increased by 13.8% between 2000 and 2005. Most of the increase in number of cases was due to the change of population structure and size.[5]

The incidence rate of cervical cancer appears to be varied according to geographical areas. For example, although the national incidence rate of cervical cancer in China is quite low, the incidence rate in specific geographical areas such as Yangcheng, Shanxi, was strikingly high (age-standardized rate of 81 per 100,000 women between 1998-2002).[10] In addition, the age-specific curves of the incidence rate appear to be varied. For example, the estimated, national, age-specific incidence rates showed a peak incidence around 50 (Table 3). However, data from the five representative population-based cancer registries showed a second peak of incidence around 80.[10]

National-level cancer mortality data is sparse in China. Specifically, the national mortality survey at 1990-1992 is dataset that is about 20 years-old. CHIS is the most comprehensive dataset and is based on the ongoing surveillance system, but the CHIS cannot be used as the national-level mortality data because the CHIS is based on non-random sampling. Therefore, researchers estimated the national mortality rates by applying the trend of mortality rates calculated from CHIS dataset to the National mortality survey dataset at 1990-1992.[11] The investigated or estimated, age-specific and age-standardized mortality rates of cervical cancer in 1991, 2000 and 2005 are summarized in Table 4. Between 1991 and 2005, the overall mortality rates of cervical cancer continuously decreased, but most of the decrease was due to the marked decrease in older age group. In the younger age group, mortality rates of cervical cancer increased. With regard to the cause of mortality rate change, most of the decrease in mortality rate was attributed to the reduced risk for cervical cancer.[11] A similar trend was observed in another study. Analysis of CHIS dataset between 1987 and 1999 showed that the mortality rate of cervical cancer decreased. The decreasing trend is sharper in urban areas than in rural areas. The decreasing trend is observed only in older age groups (older than 55); increasing trend was observed in younger women.[7]

The data on human papillomavirus (HPV) prevalence was available only in limited regions. A population-based prevalence survey of HPV infection was conducted in a rural area (Xiangyuan, Shanxi province) where a high mortality of cervical cancer was reported. Using Hybrid Capture 2 (Qiagen Gaithersburg Inc., Gaithersburg, MD, USA; previously Digene Corp.), the overall prevalence of high-risk HPV was 21% among women aged 35-50 years.[12] Another population-based survey conducted in three different areas of China (Yangcheng County in Shanxi province, Shenzhen city in Guangdong province, Shenyang city in Liaoning province) using polymerase chain reaction (PCR) method reported that the overall HPV prevalence ranged from 15% to 17%.[13]

Type distribution of HPV in China showed similar patterns with Japan and Korea. The five most common HPV types in cervical cancer was 16, 18, 58, 52, and 31; the five most common HPV types in normal cytology was 16, 58, 52, 18 and

39.[10] However, the age-specific HPV prevalence showed a different pattern from other countries. Specifically, in China, the HPV prevalence did not decrease with age, and even increased in some areas,[10,14] although the HPV prevalence was known to decrease with age in many developed countries, including Japan and Korea.[10]

In China, there is no established national program for cervical cancer prevention. However, in some areas, opportunistic cervical cancer screening for women aged 30-59 years is being conducted. Conventional Pap cytology and HPV DNA screening tests are available in urban areas, but is not available in most rural areas. Therefore, since 2006, the central government has sponsored a project to provide visual inspection with 5% acetic acid stain/visual inspection with Lugol's iodine screening to women in six counties.[10]

2. Corpus cancer

According to GLOBOCAN 2002 database,[9] the incidence and mortality rate of corpus cancer in China is lower than those of Japan but is similar with those of Korea. Specifically, the age-standardized incidence rate of corpus cancer in China is only one-third of that in Japan (Table 2).

Like cervical cancer, there is no direct data on national corpus cancer incidence in China. Only estimates based on national mortality survey at 1990-1992, CHIS dataset, and population-based cancer registry dataset are available.[5] From 2000 to 2005, the incidence of corpus cancer slightly increased. This trend was observed in most age groups (Table 3).

We could not find any English-written, estimated or directly investigated data on national corpus cancer mortality in China. The mortality rate in GLOBOCAN 2002 database was based on some population-based cancer registries.

3. Ovarian cancer

According to GLOBOCAN 2002 database,[9] the incidence and mortality rate of ovarian cancer in China is lower than those of Japan and Korea. Specifically, the age-standardized incidence rate of ovarian cancer in China is about one-half of those in Japan and Korea (Table 2).

Estimates of national incidence rates showed that the incidence of ovarian cancer slightly increased between 2000 and 2005. This trend was observed in most of age groups (Table 3).[5]

We could not find any available data on national ovarian cancer mortality in China. The mortality rate in GLOBOCAN 2002 database was based on some population-based cancer registries.

4. Breast cancer

According to GLOBOCAN 2002 database,[9] the incidence and mortality rate of breast cancer in China is lower than those of Japan but is similar with those of Korea (Table 2).

A study showed that the estimated incidence rate of breast cancer markedly increased between 2000 and 2005. The increase was observed in all age groups. The increasing incidence rate was due to the change of risk rather than the change of population structure and size.[5]

The estimated breast cancer mortality rates increased between 1991 and 2005. The increase was sharper in the younger age group than in the older age group (Table 4).[11] Similarly, in another study, the analysis of CHIS dataset showed that the increasing mortality rate of breast cancer was confined to the younger age group.[7] Both increased risk and change of population structure/size contributed to the increase of mortality rates.[11]

5. Gynecological cancer in Shanghai

Shanghai is one of the biggest cities of China. The incidence of breast cancer in 2005 doubled when compared to that of the earlier 1980s. The incidence of cervical cancer significantly decreased in 1990s, but increased slightly in 2000s because of HPV infection in young women. The incidence of ovarian cancer still ranks the first among gynecological cancers during the past two decades (Fig. 1).

CONCLUSIONS

In China, the incidence rate of cervical cancer is slowly decreasing and that of breast cancer is sharply increasing. Corpus and ovarian cancer showed a slight increase in

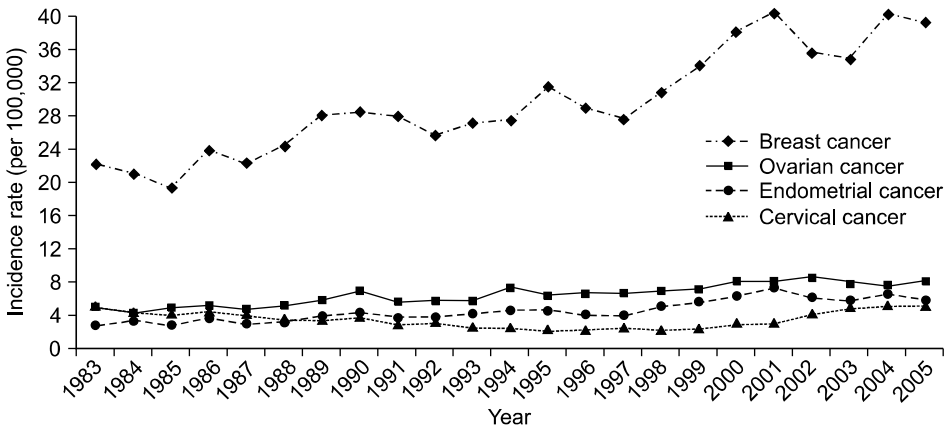

Fig. 1. The incidence of gynecological cancers in Shanghai, China.

incidence. Due to population expansion and increasing proportion of the elderly population, the number of gynecological cancers in China will rapidly increase. It is noteworthy that cervical and breast cancer increased more in young women than in elderly women.

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