

Disparities of mortality and risk factors of stroke and heart disease in Japanese and Chinese population

Enbo Ma¹, Farhana Ferdousi², Hiroyasu Iso³, Gonghuan Yang⁴, Xia Wan⁴, Hideto Takahashi¹, Yukiko Wagatsuma¹

¹Faculty of Medicine, University of Tsukuba

²Graduate School of Comprehensive of Human Sciences, Tsukuba University

³Graduate School of Medicine, Osaka University

⁴Institute of Basic Medicine, Chinese Academy of Medical Sciences & School of Basic Medicine, Peking Union Medical College

Background

From the last few decades East Asian countries are experiencing transitions in different sectors-

- decreased fertility rate and mortality rate; therefore, increased ageing population
- Cause of mortality is shifting from infectious diseases to chronic non-communicable diseases
- **Rapid and early phase of westernization:** dietary habit changes and other behavioral changes.

In Japan:

- Japan had the highest stroke mortality in the world in 1965. It rapidly decreased by about 80% during the year 1965–1990.¹
- Age-adjusted mortality rates from coronary heart diseases (CHD) declined 50% for men and 65% for women between 1969 and 1992.¹
- In 2008, the mortalities from CHD and stroke account for 15.8% and 11.5% respectively.²

In China:

- Non-communicable diseases increased from 58.2% in 1973-75 to 73.8% in 1991 and 82.9% in 2000.
- Interestingly, the cardiovascular disease (CVD) mortality trends in China is now showing the similar characteristics of the Japanese trend observed in the past.¹

Materials & Methods

National health and nutrition survey in Japan:

- It is carried out by the Japanese government since 1945.
- Many survey items were gradually input by stratified random samples, such as-
Overweight and dietary intake since 1970
Physical activity, alcohol consumption, and smoking habit since 1985

Disease Surveillance Points (DSPs)

- China CDC has started DSPs since 1980 to generate cause specific mortality statistics.
- 145 DSPs in 61 urban and rural sites.
- DSPs cover 1% (130 million) of Chinese population

Table 1

SMR of CHD and Stroke per 100,000 population (30-84y) in Japan (standardized by world population in 2000)³

Cause of death	SMR in 1990	SMR in 2005	
Stroke	110.5	92.5	↓ 18.0
CHD	41.1	48.9	↑ 7.8

Table 2

Leading causes of death and mortality rates (MR) in China per 100,000 population⁴

Rank	1990~1992		2004~2005		
	Cause of death	MR	Cause of death	MR	
1	Respiratory diseases	137.52	Stroke	136.64	34.71 ↑
2	Cancer	108.26	Cancer	135.88	
3	Stroke	101.93	Respiratory diseases	96.28	
4	Injury	66.16	Heart diseases	90.23	37.53 ↑
5	Heart disease	52.70	Injury	61.51	

Table 3

SMR of CHD and Stroke in 2005 per 100,000 population (standardized by world population in 2000)

	Japan	China
Stroke	45.0	149.4
Heart Disease	38.2	100.1

Objective of the study

To explore and develop new interventional strategies to control CVDs in Japan and China by-

1. Comparing the mortality trends from CVDs between Japanese and Chinese population.
2. Investigating the relevant risk factors of CVDs and exploring the differences between these two populations.

Materials & Methods

1st Stage:

Mortality rates from CVDs will be compared between Japan and China.

Data collection:

- In Japan, annual reports from national vital statistics and national cross-sectional surveys.
- In China, reports from national sampling mortality surveys and Disease Surveillance Points (DSPs) mortality surveys.

Statistical analysis:

- Standardized mortality rates (SMR)
- May also use-
-Autoregressive integrated moving average model (ARIMA)
- Age-period-cohort analysis

2nd Stage:

Relevant risk factors of CVDs will be identified and compared between two populations.

Data collection:

- In Japan, reports from national health and nutrition survey and large-scale cohort studies
- In China, reports from risk survey and cohort studies by DSPs.

Table 4: Trends in risk factors between two populations (1/100)

	Japan ^a			China ^{†,‡}		
	Year	Male	Female	Year	Male	Female
Blood pressure	1962 ^a	↓ 142/82	141/81	1991 ^b	20.2	19.7
	2000 ^a	↓ 137/83	132/78	2001 ^b	↑ 28.6	25.8
Current Smoker	2003 ^a	↓ 46.8	11.3	1996 ^b	66.9	4.2
	2009 ^a	↓ 38.2	10.9	2002 ^b	↓ 57.0	3.1
Alcohol intake(current drinker)	2003 ^a	↓ 42.9	9.3	2002 ^{a,c,5}	86.11	48.32
	2009 ^a	↓ 36.4	6.9	2005 ^{a,c,5}	↑ 89.77	54.81
Overweight & Obesity	1995 ^a	24.8	↓ 26	1992 ^{b,6}	16.55	21.05
	2008 ^a	↑ 31.7	↓ 21.8	2002 ^{b,6}	↑ 26.35	25.3
Salt intake (g/day)	2003	↓ 12.7	10.9	2002		12.0
	2009	↓ 11.6	9.9			
Cholesterol intake (g/day)	2001	303	271	1989 ^{d,7}		14.7
	2009	↑ 333	284	2006 ^{d,7}	↑	44.1

^aNational Health and Nutrition Survey in Japan.

[†]1992 China National Nutrition Survey.

[‡]2002 China National Nutrition and Health Survey

^amean SBP/mean DBP

^bProportion rate,

^cPrevalence rate

[†]A study in Hubei province.

⁵Percentage of people who take >30% of energy from fat

Conclusions

- China is now facing public health crisis with the rapid increase in CVDs. Thus, it is urgent to carry out critical CVD control programs.

- More detailed critical review for specific risk factors is necessary in order to predict future trends in mortality from CVDs.

Future Expectations

- To define the CVD risk profiles between two populations in order to develop new interventional strategies for CVD control.

- To develop standardized questionnaires to use in the next national surveys in both countries, particularly for risk factors which would be incomparable from the existing survey reports.

References:

- ¹Ueshima H. et al (2008). Cardiovascular Disease and Risk Factors in Asia: A Selected Review. NIH Public Access 118(25): 2702-2709.
- ²Healthy Japan 21 Century: <http://www.kenkoujippou21.gr.jp/>
- ³National Health and Nutrition Survey in Japan.
- ⁴Chen Z (2008). The 3rd National Sampling Mortality Survey Report. The PUMC press.
- ⁵Zhang J. et al (2007). Increased drinking in a metropolitan city in China: a study of alcohol consumption patterns and changes. Addiction 103: 416-423.
- ⁶Wang Y et al (2007). Is China facing an obesity epidemic and the consequences? The trends in obesity and chronic disease in China. Intl J Obs 31:177-188.
- ⁷Popkin B.M. et al (2008). Will China's Nutrition Transition Overwhelm Its Health Care System And Slow Economic Growth? Health Affairs, 27: 1064-1076

Further Information: Dr. Enbo Ma (e-mail: mae@md.tsukuba.ac.jp)

Acknowledgement: The work was supported in part by JSPS (Grant-in-Aids, no: 23590777)