

Changes in Dietary Patterns and Certain Nutrition-related Diseases in Urban and Rural Residents of Jiangsu Province, China, During the 1990s¹

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Objective To investigate into the changes of dietary patterns and their impacts on health of urban and rural residents in Jiangsu Province, China during the 1990s. **Methods** On the basis of the results of food consumption survey, the calorie intake was calculated according to the balanced diet method and the quality of diet was assessed by scores of desirable dietary pattern (DDP). **Results** It was found that food consumption and dietary patterns changed remarkably during the 1990s. Grain consumption was decreasing year by year, but the consumption of animal food was markedly increasing. Although the score of desirable dietary pattern (DDP) in urban residents was more than 90, the deducted score due to over-consumption of animal food increased. The mortality from infectious diseases evidently decreased in the whole province, while the death rates of some chronic diseases, such as diabetes, hypertension, colorectal cancer and breast cancer, were increasing rapidly in urban areas. **Conclusions** Sufficient attention should be paid to the negative effects of change in dietary patterns on people's health, especially in the urban residents.

Key words: Dietary patterns; Nutrition-related diseases

INTRODUCTION

Jiangsu is a relatively developed province in China, with its people's living standard at a higher level. According to the criteria of FAO^[1], Jiangsu residents as a whole, have accomplished historical transition from a living of being barely enough to relatively comfortable one. Parts of the urban and rural residents have approached or attained well-to-do level and very comfortable level respectively in the late 1990s^[2]. However, as both domestic and overseas researchers have concluded^[3,4], it was in this period that major changes in dietary patterns did happen and those in social dietary patterns would most likely

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exert their negative effects on people's health. Hence timely investigation into the changes in dietary patterns and their impacts on people's health will be conducive to reorientation of food industries and recommendations for reasonable food consumption so as to coordinate the balanced development of domestic economy and health of the general population. For this aim, the changes in food consumption, dietary patterns and nutrition-related diseases were studied among the urban and rural residents in Jiangsu Province during the 1990s.

MATERIALS AND METHODS

Food Consumption Survey

The data were taken from the randomized sampling investigation of food consumption of Jiangsu residents, urban and rural separately. The investigation was performed by trained personnel of the Jiangsu Provincial Urban and Rural Socio-economic Investigation Teams within the period of time stipulated by the National Bureau of Statistics. The calorie intake was calculated according to the balanced diet method^[5] and the quality of diet was assessed by scores of desirable dietary pattern (DDP)^[6] from 1990 to 1999.

Mortality of Chronic Diseases

The mortality data of chronic diseases were obtained from the annual reports on death causes provided by the Health Statistical Information Center, Bureau of Health of Jiangsu Province. With the health and anti-epidemic stations at all levels as the grass roots units, Jiangsu has established a network to collect information about the causes of death since early 1980s. The investigated diseases were coded according to ICD-9 (International Classification of Diseases).

RESULTS

Changes in Food Consumption During the 1990s (Tables 1 and 2)

Changes in food consumption in the 1990s were described by comparing the data from the following 3 periods, i.e. the early (1990-1993), the middle (1994-1996) and the late (1997-1999) 1990s. The changes observed were as follows.

Plant Foods. Grain consumption decreased both in urban and rural areas in the past decade. The averaged decrease was about 24 kg (21.6%) per capita in cities, much more marked than in rural areas. The consumption of vegetables also decreased, but was still maintained around 110 kg per year. The consumption of beans was much lower than the recommended 8 kg/year^[7], especially among the urban residents. The vegetable oil consumption increased both in urban and rural areas.

Animal Foods. As the grain consumption was reduced, the consumption of animal foods increased markedly. Over the past decade, the increase was 23.4% in the city and 34.1% in the country. As the rural consumption of meat was rising rather rapidly from its original lower level, the urban and rural difference in this respect was narrowed gradually.

Foods With Empty Calorie. With a tendency of stabilized consumption of sugar (about 2 kg/year), the use of alcohol tended to decrease in the city, but increased year by year in the country, by 38% in the 1990s.

TABLE 1

Food Consumption Data in Jiangsu Province During the 1990s:
Urban Residents (kg/year per capita)

	Early 90s	Middle 90s	Late 90s	Increment	Increment ^a
				+/-	%
Grain	110.35	95.04	86.50	-23.85	-21.61
Vegetables	115.85	109.16	110.16	-5.69	-4.91
Fruits	43.88	45.90	53.34	9.45	21.54
Vegetable oil	7.55	7.28	8.16	0.61	8.12
Pork	19.56	19.38	19.29	-0.27	-1.37
Mutton and beef	1.84	1.55	1.74	-0.10	-5.43
Poultry	5.82	6.92	8.72	2.90	49.76
Eggs	9.93	10.93	12.62	2.69	27.06
Fish and crustaceans	11.82	13.89	16.97	5.15	43.54
Fresh milk	3.85	3.75	6.70	2.86	74.23
Sugar	2.44	2.09	2.35	-0.09	-3.69
Soybean	-	0.2	0.27	0.07	35.00
Other beans	-	0.69	0.57	-0.12	-17.39
Bean products ^b	-	8.28	10.14	1.86	22.46
Cakes and sweets	4.17	3.62	3.58	-0.59	-14.15
Spirits and wines	2.87	2.68	2.55	-0.32	-11.23

Note. ^a Increment (%) = (Late 90s - Early 90s) / Early 90s × 100%; ^b 10 kg of bean products is equivalent to 2 kg of dry soybean.

TABLE 2

Food Consumption Data in Jiangsu Province During the 1990s:
Rural Residents (kg/year per capita)

	Early 90s	Middle 90s	Late 90s	Increment	Increment ^a
				+/-	%
Grain	217.79	205.80	204.65	-13.15	-6.04
Vegetables	129.25	113.63	114.90	-14.35	-11.10
Vegetable oil	6.85	7.43	7.87	1.02	14.84
Pork	9.73	10.53	11.23	1.51	15.51
Mutton and beef	0.65	1.10	1.67	1.02	156.41
Poultry	2.05	3.30	4.43	2.38	116.26
Eggs	6.68	7.70	7.53	0.86	12.86
Fish and crustaceans	5.50	7.53	8.23	2.73	49.70
Animal oil	0.60	0.67	0.70	0.10	16.67
Soybean	-	1.78	1.95	0.17	9.55
Other beans	-	0.35	0.28	-0.07	-20.00
Bean products ^b	-	5.51	5.10	-0.41	-7.44
Sugar	1.78	1.77	2.00	0.23	12.68
Spirits and wines	7.25	8.80	10.00	2.75	37.93

Note. ^a Increment (%) = (Late 90s - Early 90s) / Early 90s × 100%; ^b 10 kg of bean products is equivalent to 2 kg of dry soybean.

Scoring of Desirable Dietary Pattern (Table 3)

The DDP score of rural residents increased by 5.8 points in Jiangsu Province in the past decade, with the higher percentage of calorie from grain declining and the lower caloric percentage from animal food increasing. The DDP score of urban residents was kept above 90 points. As the caloric value of animal food was too high, more and more DDP scores were being deducted.

Mortality Rate of Nutrition-related Diseases (Table 4)

The mortality rate of infectious diseases has dropped greatly both in the city and in the country, as a result of the improvement of living standard and nutrition status. However, the mortality of diseases widely recognized as being related to dietary imbalance has gone up very rapidly in cities during the 1990s. For example, the mortality from diabetes doubled in the late 1990s compared with that in the early 1990s, that from hypertensive heart disease increased by about one third, and that from colorectal cancer as a single disease entity exceeded that from all infectious diseases collectively in the middle 1990s.

DISCUSSION

During the 1990s, the diet of rural residents in Jiangsu Province improved markedly in quality. The changes in dietary patterns in urban residents were characterized by greatly reduced grain consumption and evidently increased intake of animal foods. Although the yearly DDP score in cities was kept over 90 points, the score deducted owing to overconsumption of animal food was increasing, which was similar to the situation observed in Beijing and Guangdong^[8]. As a whole, the dietary pattern in Jiangsu was changing evidently during the past decade, compared with the survey made by the end of the 1980s^[9].

In the present survey, it was also found that chickens bred in industrialized conditions were the top source of poultry meat. It is known that the fat content of such chickens is equal to that of pork, 7.9 times higher than that of the chicken traditionally raised in the yard by peasants^[10]. Hence the government should be advised to be cautious in making policies to orientate the breeding and consumption of chickens bred in industrialized conditions, though they grow quickly and can bring about higher profits.

The mortality survey of Jiangsu urban residents in the 1990s was featured by dramatic drop in the mortality from infectious diseases and rapid rise in that from nutrition-related diseases. The number of deaths due to "abundance" diseases was higher in cities than in the country. Tables 1-3 revealed distinct changes in food consumption and dietary pattern in the whole province, especially in the intake of grain and animal foods. It can also be noticed that the mortalities of colorectal cancer and breast cancer in urban residents increased more quickly than that of other malignancies that are less related to food factors. Thus it can be seen that the above mentioned rapid increase in mortality of certain chronic diseases may be attributed to the negative effects of dietary pattern changes. This is consistent both with our findings in another study^[11] and with the results of the survey conducted in Shenyang City^[4]. Such situation is much similar to the disease transition experienced by the western countries during the period of industrialization when the dietary pattern was undergoing marked changes and the diseases resulting from "rich diets" posed a heavy burden on them. The changes in disease patterns in Jiangsu during the 1990s have been indeed sounding an *alarm* for the whole country.

TABLE 3
Changes of Dietary Caloric Sources and DDP Scoring in Jiangsu Residents During the 1990s

	Urban Areas						Rural Areas					
	Caloric Percentage (%)			DDP Scoring (points)			Caloric Percentage (%)			DDP Scoring (points)		
	Early	Middle	Late	Early	Middle	Late	Early	Middle	Late	Early	Middle	Late
Grain	60.0	55.8	51.3	30.0	27.9	25.7	79.6	76.4	74.9	39.8	38.2	37.4
Animal food	19.9	22.4	24.8	49.7	56.1	62.1	6.7	8.1	8.9	16.7	20.2	22.1
Cooking oil	9.5	9.9	11.1	9.5	9.9	11.1	6.5	7.2	7.5	6.5	7.2	7.5
Beans & bean products	0.0	0.9	1.0	0.0	2.2	2.4	0.0	1.0	1.0	0.0	2.5	2.5
Sugar	1.5	1.4	1.5	0.7	0.7	0.8	0.7	0.8	0.8	0.4	0.4	0.4
Vegetables & fruits	7.8	8.2	8.8	15.5	16.4	17.7	3.8	3.4	3.4	7.7	6.8	6.8
Alcoholic & soft drinks	1.4	1.4	1.4	0.0	0.0	0.0	2.5	3.1	3.5	0.0	0.0	0.0
Total (gross)				105.4	113.2	119.8				71.1	75.4	76.9
Points deducted				10.2	17.5	25.9				0	0	0
Total (net)				95.2	95.7	93.9				71.1	75.4	76.9

TABLE 4

Mortality of Nutrition-related Diseases in Urban and Rural Residents of Jiangsu Province During the 1990s (1/10⁵)

	Urban Areas						Rural Areas					
	Early			Late			Increment* (%)			Increment* (%)		
	Early	Middle	Late	Early	Middle	Late	Early	Middle	Late	Early	Middle	Late
Infectious diseases	10.43	6.79	6.15	6.15	6.15	6.15	17.11	9.62	8.42	8.42	8.42	-50.80
Diabetes	8.20	12.30	15.70	15.70	15.70	15.70	4.09	4.50	5.56	5.56	5.56	35.82
Colorectal cancer	7.86	8.75	10.06	10.06	10.06	10.06	6.74	6.31	5.42	5.42	5.42	-19.52
Breast cancer	2.81	3.04	3.39	3.39	3.39	3.39	2.17	2.36	2.43	2.43	2.43	12.24
Other malignancies	138.32	138.48	148.82	148.82	148.82	148.82	178.82	196.29	181.50	181.50	181.50	1.50
Hypertensive heart dis.	4.97	6.99	6.85	6.85	6.99	6.85	6.10	4.11	3.96	3.96	3.96	-35.16
Other hypertensive dis.	3.07	3.96	3.48	3.48	3.96	3.48	1.75	0.54	0.93	0.93	0.93	-47.14
Acute myocardial infarction	14.51	16.25	19.04	19.04	16.25	14.51	9.68	16.48	15.05	15.05	15.05	55.48
Other coronary heart dis.	15.65	18.86	23.95	23.95	18.86	15.65	11.87	11.49	14.96	14.96	14.96	26.03

Note. * Increment (%) = (Late - Early) / Early × 100%.

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