

The Nutrition Survey, Nutrition Surveillance and Nutrition Status in China

Zhai Fengying*, Yu Dongmei

Chinese Center for Disease Control and Prevention, China

ABSTRACT

With the prosperous economy, the status of diet and nutrition among the urban and rural Chinese population has been improved significantly. This paper will focus on three main surveys in China. (1) "Food and Nutrition Surveillance System in China": Phase I focused on analysis of previous data. Phase II was a pilot survey initiated in Beijing, Hebei, Heilongjiang, Ningxia, Zhejiang, Guangzhou, and Sichuan in 1990. (2) "The China Health and Nutrition Survey" is an ongoing longitudinal project covered 8(9) provinces in 1991, 1993, 1997, 2000. This paper will analyze the adults aged 18-45 of 1991, 1993, 1997, and 2000. (3) Survey on the status of nutrition and health of the Chinese (2002) is an across-sectional study covered 31 provinces, autonomous region and the municipalities. The data was used to analyze the status of food consumption and dietary nutrients intake of Chinese population. In the past ten years, the prevalence of malnutrition and nutrition deficiency has been continuously decreased. The consumptions of animal products, milk, and edible oil have been increased, while the dairy and legume products consumption decreased. The unbalance was showed with a downward trend in cereals, vegetables and fruits consumption and a significant increase in animal products and oil intake among urban people. Dietary pattern of some subjects went away to "high energy density" diet. The deficiency of calcium, retinal and ascorbic acid etc, especially in the rural areas still exist. China is undergoing a remarkable, but undesirable, rapid transition towards a stage of the nutrition transition characterized by high rates of DR-NCDs in a very short time. China is facing the dual challenges of nutrition deficiency and nutrition imbalance. The results can help to understand the dietary structure and the status of nutrition among Chinese people over the past years. It will provide the basis for formulating relevant state policies.

KEY WORDS: nutrition surveillance · nutrition status · nutrition survey · nutrition transition

Introduction

Twenty five years ago, China introduced sweeping reforms in the structure of its rural economy and the economy has experienced exponential growth in the past decade, with per capita GDP rising from 460 yuan in 1980 to 7084 yuan in 2000 (Chinese Statistical Yearbook, 1980-2000). Since 1990 the annual rate of per capita GDP growth has been 8.6 percent (UNDP, 2004). At the same time, family planning program, and

financial accountability within enterprises and service sector organizations. A rapid rise in economic productivity has resulted in continuing increases in income and changes to the traditional Chinese diet. But these changes are occurring at markedly different rates across the country. A post reform China in the new millennium occurring at markedly different rates across the country and facing a range of challenges in health, nutrition, and family planning.

The theory of the nutrition transition posits that these changes or stages relate to the complex interplay of changes in patterns of agricultural, health, nutrition status, food consumption and socio economic factors. Following rapid economic and social change, the pace of nutrition transition accelerated in China (Shufa Du et al. 2004; Huijun Wang et al/ 2003; Popkin 2001). From the perspective of development, the effects of increased income have generally been viewed as beneficial, since higher income is associated with better quality diets, better health care, better child growth and so on. On the other hand, as income increases, dietary changes typically include higher energy and fat intakes, increased consumption of animal foods and processed foods.

It is undergoing a remarkable fast shift toward a stage of the nutrition transition in urban areas dominated by a high intake of fat and animal food as well, and a high prevalence of diet related non communicable diseases such as obesity, adult onset diabetes mellitus, cardiovascular diseases and cancer (F Zhai et al.2002). In the past ten years, the status of diet and nutrition among the urban and rural Chinese population has been improved significantly, and the prevalence of malnutrition and nutrition deficiency has been continuously decreased. However, in the meantime China is still facing the dual challenges of nutrition deficiency and nutrition imbalance.

This paper will focus on three main surveys in China. The results can help to understand the dietary structure and the status of nutrition among Chinese people. It will provide the basis for formulating relevant state policies including the development of agriculture and food industries. It also can help to understand the actions promoting the health for Chinese.

Subjects and Methods

1. Food and Nutrition Surveillance System in China

- a) Based on the experiences of the pilot study initiated in Beijing, Hebei, Heilongjiang, Ningxia, Zhejiang, Guangzhou, and Sichuan in 1990 to 1995, a National Food and Nutrition Surveillance System was established in 1997 (Chen Chunming et al.2004). Under the collaboration of the Food and Nutrition Surveillance System (FNSS) Working Group of the Chinese Academy of Preventive Medicine (CAPM, now is China CDC), the Urban Household Survey Team and the Rural Household Survey Team of the State Statistic Bureau(SSB) of China, the national surveillance network is formulated by stratified random sampling. It consists 40 sites, 26 rural

sites and 14 urban sites in 26 provinces.

- b) In 1998, data on food consumption, anthropometric measurements of children under 6 were collected, basic information of households and feeding practice were recorded by questionnaire. In 1998 surveillance, there were 1875 rural households and 869 urban household were sampled. Height and weight of 16463 children under 6 were measured.
- c) The survey included indicators suggested by CAPM. The food, nutrition, and anthropometric measurements were chosen to provide indicators of change in nutritional status, food consumption behavior, health and sanitation, and socio economic status. Child body weight and height measurements, feeding after birth, breast feeding, complementary feeding of infant, diseases, medical care services etc. were included in the survey.

2. The China Health and Nutrition Survey

- a) It is an ongoing longitudinal project conducted jointly by CAPM (now is China CDC) and the University of North Carolina at Chapel Hill in 1991, 1993, 1997, 2000.
- b) A multistage, random cluster sample was used to draw the sample surveyed in each of the provinces. The survey covers nine provinces that vary substantially in geography, economic development, public resources, and health indicators from 1997. Currently there are about 3800 households in the overall survey, covering 16,000 individuals including all age groups.
- c) The surveys collected information on all individuals living in the household e.g. the all information of household, individual dietary intake, physical examinations, community infrastructure and so on.
- d) This paper will analysis the adults aged 18 45 of 1991, 1993, 1997, and 2000. There were 5072 adults in 1989, 5710 in 1991, 5202 in 1993, 5048 in 1997 and 5160 in 2000.

3. Survey on the status of nutrition and health of the Chinese (2002)

- a) It was an across sectional study and conducted under the joint leadership of the Ministry of Health, the Ministry of Science and Technology and the National Bureau of Statistics in 2002. It's a national study and there have been four surveys in 1959, 1982, 1992, and 2002. The data was used to analyze the status of food consumption and dietary nutrients intake of Chinese population.

b) Sampling methods

The survey covered 31 provinces, autonomous region and the municipalities directly under the Central government. A multistage stratified cluster sampling scheme was used. All counties and districts were stratified into six areas. In order to ensure sufficient number of pregnant women, breast feeding mothers, infants, babies and children under the age of 12 years old and to ensure sample and the total size in each

group, additional subjects were included in the sample. There were 23 470 households including 68 962 subjects in the analysis.

c) Data collection and analysis

The survey collected food intake information, information of household, physical examinations and so on. The dietary nutrients intakes were calculated by China Food Composition Database of 2002 (Yuexin Y et al. 2002). This paper reported the results of food consumption and dietary nutrients intake as per reference man per day (Chinese Nutrition Society, 2000).

4. All the surveys' objective is to provide information to policy makers in all governmental sectors that responsible for the food security of China and that affect the health and nutrition of the Chinese population.

Results and Discussion

1. Food and Nutrition Surveillance System in China

a) Food consumption and nutrition of urban residents

The households' average consumption of total animal food consumption was increased. Energy from fat was increased. The trend of dietary change was increase of animal food along with reduction of cereal consumption, but before 1992, the dietary change was characterized with swift and continuous increase of vegetable oil. Desirable Dietary Pattern (DDP) - China for 2000 was applied for evaluation of dietary pattern, the score for diet of urban households was reasonable. The direction of accomplishing the goal of a balanced diet will be : maintain cereal consumption, keep animal food moderate and encourage bean consumption to replace part of animal food.

Evidently, the current trend of food consumption pattern will be disadvantageous both to health and to the economic development. China should replacing partial meat consumption with beans and bean products. As the priority measure for nutrition improvement of urban people, it is not only beneficial to the health of the people, more importantly it is feasible economically as well.

b) Food consumption and nutrition of rural residents

The overall food consumption has improved in the rural households. Cereal, vegetable, fruit consumption were increased. Meat consumption was increased. Poultry consumption was increased since 1992. Daily energy intake, protein intake, energy contribution by cereals, energy from animal food were increased DDP score of rural diet lower than the urban score

Quantitative and qualitative improvement of nutrition among rural residents should be focused on the increase of soybean and animal food consumption. Immediate action on

promoting a more balanced diet and better protein and micronutrient nutrition at affordable cost.

c) Nutrition status of children in 1990 - 2000

The survey showed the growth and development of the urban and rural children improved during the past 10 years (Table 1). The national average prevalence of underweight of children under 5 was 11.2% in 2000, 13.9% in the rural and 3.0% in the urban areas. The national average prevalence of stunting of children under 5 was 16.1%, 20.5% in the rural and 2.9% in the urban areas. The reduction of prevalence of underweight was 41%, while stunting was 52% in 1990 - 2000 (Table 2). The prevalence of malnutrition of children under 5 in rural was higher than that of urban, especially in poor rural. The improvement should according to the different areas. To guarantee the nutrition adequacy of children under 2, in rural China, actions on complementary feeding ought to be taken as a priority strategy parallel with exclusive breastfeeding in 4 - 6 month after birth.

Per capita GNP, number of health professionals per thousand population, number of hospital bed per thousand population were closely related to the infant mortality. The strategy for child nutrition improvement should focus on rural area and complementary feeding should be a key approach as important as breastfeeding to be stressed on.

Table 1. Prevalence of malnutrition of children under 5 in China

year	Underweight %					Stunting %				
	U	R	Natl	R U	R/U	U	R	Natl	R U	R/U
1990	8.6	22.6	19.1	14.0	2.6	9.4	41.4	33.4	32.0	4.4
1992	6.2	19.4	16.2	13.2	3.1	9.2	39.7	32.1	30.5	4.3
1995	4.6	17.8	14.5	13.2	3.9	8.9	39.1	31.6	30.2	4.4
1998	2.5	12.5	10.0	10.0	5.0	4.0	22.2	17.6	18.2	5.6
2000	3.0	13.9	11.2	10.9	4.6	2.9	20.5	16.1	17.6	7.1

U urban R rural Natl National R U Rural minus Urban U/R Urban/Rural

Table 2. Reduction of prevalence of malnutrition of children under 5 in China in ten year (1990 - 2000)

	reduction of prevalence of underweight %	reduction of prevalence of stunting %
urban	65.1	69.1
rural	38.5	50.5
national	41.4	51.8

2. The China Health and Nutrition Survey

a) The intake of food groups for adults

Adult's intake of cereals and starchy roots has declined over the past ten years. Intake of vegetables and fruits has remained relatively stable. During the same period the consumption of animal food, especially the consumption of meat and egg increased (table 3). These trends generally represent positive developments in adult's diets.

The food group changes accompany the trend in increasing the consumption of pork, milk and vegetable oils. About one half of dietary fat comes from edible oil, while the consumption of refined animal fat decreased. Critical to controlling fat intake of the Chinese diet is decreasing consumption of vegetable oil, pork and pork products.

Table 3. Trends in intake of food groups for adults by residence (g/day)

food	total					rural					urban				
	1989	1991	1993	1997	2000	1989	1991	1993	1997	2000	1989	1991	1993	1997	2000
Cereals															
rice	348	337	320	297	274	362	338	335	312	290	316	336	284	262	237
wheat	190	196	199	181	152	193	196	211	193	154	183	194	169	153	146
maize	44	25	21	20	14	60	28	27	25	16	10	18	6	6	7
other	19	10	11	8	6	26	9	12	9	6	5	11	6	6	7
Tubers															
potato	18	26	23	28	27	22	28	27	32	30	9	23	12	19	19
sweet potato	58	24	13	10	6	75	26	16	13	7	21	18	6	4	3
other	71	44	53	45	40	77	41	55	46	41	58	50	48	44	48
Meat															
beef	3	4	6	7	7	2	4	5	5	5	5	5	10	11	11
pork	52	59	62	60	69	44	59	52	49	60	71	59	89	86	91
poultry	7	7	9	12	14	4	7	6	10	12	12	7	14	17	19
eggs	11	14	15	24	26	9	13	12	20	23	16	15	22	33	32
fish	24	21	22	28	26	22	21	20	25	25	27	22	28	35	30
other	2	1	1	2	2	2	1	1	1	1	2	1	2	5	4
Dairy															
fresh milk	12	18	21	1.5	3.8	0.1	1.3	0.8	0.5	1.7	3.5	2.9	5.3	3.9	9.3
powdered milk	0.1	0.2	0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.0	0.3	0.3	0.2	0.8	0.8
Legumes															
pulses	79	80	77	81	96	78	80	77	79	96	80	80	78	87	95
nuts	3	3	2	2	4	3	3	2	3	4	5	3	3	2	3
Vegetables															
light color	227	181	178	172	159	242	181	188	183	169	182	151	148	133	163
dark color	53	84	94	98	98	53	86	102	98	100	53	79	76	97	92
Salted vegetable	16	13	12	10	8	19	16	13	11	8	8	8	10	9	7
Fruit															
citrus	2	1	1	2	1	1	1	1	1	1	3	2	2	3	2
other	12	8	11	8	11	13	7	10	5	7	11	10	14	17	20
Fats and oils															
animal fat	18	13	10	10	12	19	14	11	10	12	15	12	9	9	12
vegetable oil	32	22	22	31	30	30	22	21	30	30	37	22	26	34	30
Sugar															
soft drink	0.1	0.1	0.1	0.4	0.3	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	1.1	0.4
confectionary	2.6	1.8	2.0	2.5	2.0	2.3	1.8	1.4	2.3	1.9	3.5	1.8	3.3	3.0	2.3

b) Energy and nutrients intake for adults

The energy and protein intake was decreased from the survey of 1989 to 2000(Table 4). The proportion of dietary energy derived from fat in the adult diet has dramatically increased over the past decade (Figure 1). The proportion of energy from fat reached 30% in the suburb and town areas and 35% in urban areas. The average calcium intake among the urban and rural population was only about 430 milligrams per day. The intake of vitamins and other minerals was steady.

Table 4. Nutrients intake by communities

community	year	N	Nutrients									
			Energy (MJ)	Protein (g)	Calcium (mg)	Iron (mg)	Zinc (mg)	Retinol (RE)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Ascorbic Acid (mg)
city	1989	934	10.8	77.1	395.7	24.2	11.7	546.8	1.2	0.8	15.9	85.4
	1991	858	10.2	72.3	360.4	21.0	11.1	527.8	1.1	0.7	14.5	90.8
	1993	645	9.8	75.1	373.8	22.1	11.1	568.2	1.1	0.8	15.9	78.4
	1997	660	10.3	78.9	422.0	26.4	12.9	639.5	1.1	0.9	18.0	83.3
	2000	609	10.0	77.1	437.5	25.6	12.5	659.0	1.1	0.9	17.6	87.4
suburb	1989	988	12.5	84.6	458.7	25.8	13.2	730.8	1.4	0.9	17.3	135.7
	1991	944	10.5	72.2	353.7	21.2	11.2	496.2	1.2	0.7	14.6	99.7
	1993	877	11.0	80.0	420.5	23.2	12.4	559.7	1.2	0.8	16.4	106.4
	1997	919	11.2	77.5	464.5	28.4	13.3	624.8	1.1	0.9	18.3	101.7
	2000	882	10.4	75.6	431.8	25.5	12.6	608.8	1.1	0.9	18.0	96.0
town	1989	879	11.8	81.2	434.6	26.2	12.8	554.5	1.3	0.8	17.1	101.1
	1991	808	10.8	74.4	367.2	23.3	11.7	395.8	1.3	0.7	14.5	95.1
	1993	783	10.7	78.5	365.8	22.0	12.1	548.2	1.2	0.8	16.4	83.2
	1997	705	10.1	72.1	388.0	24.3	12.2	589.3	1.1	0.8	16.9	83.9
	2000	852	10.2	73.5	395.6	24.7	12.4	533.0	1.1	0.8	16.7	80.6
village	1989	2976	13.2	86.6	493.1	28.3	14.0	594.8	1.5	0.9	18.4	143.4
	1991	2877	10.5	74.2	365.9	22.5	11.4	410.4	1.2	0.7	14.8	88.2
	1993	2892	11.6	81.9	415.3	24.5	13.0	393.3	1.4	0.8	16.6	113.8
	1997	2595	11.0	74.3	396.9	25.8	12.7	391.0	1.3	0.8	17.1	92.4
	2000	2725	10.6	70.2	441.3	25.7	12.3	421.4	1.2	0.8	16.1	102.2
total	1989	5777	12.5	83.9	462.5	26.9	13.3	604.3	1.4	0.9	17.6	126.3
	1991	5487	10.5	73.6	363.1	22.1	11.4	441.9	1.2	0.7	14.7	91.6
	1993	5197	11.2	80.2	403.1	23.6	12.5	468.6	1.3	0.8	16.5	103.2
	1997	4879	10.8	75.2	412.0	26.1	12.8	501.7	1.2	0.8	17.4	91.6
	2000	5068	10.4	72.5	431.5	25.5	12.4	501.3	1.1	0.8	16.7	95.7

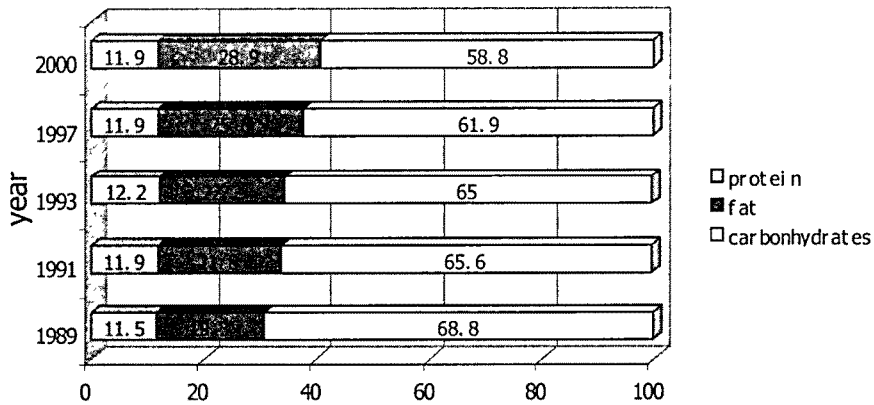


Figure 1. Trends in percent of macronutrients as proportion of total dietary energy intake

c) Nutrition status for adults

Trends in the nutrition status of the Chinese population clearly demonstrate that undernutrition is reducing rapidly, while overweight and obesity are increasing in both children and adults. Micronutrient deficiencies such as iron and vitamin A are still a problem in both in urban and rural areas. Data showed that almost 19.9% of the adult population was overweight. While 6.8% of adults were underweight (Figure 2).

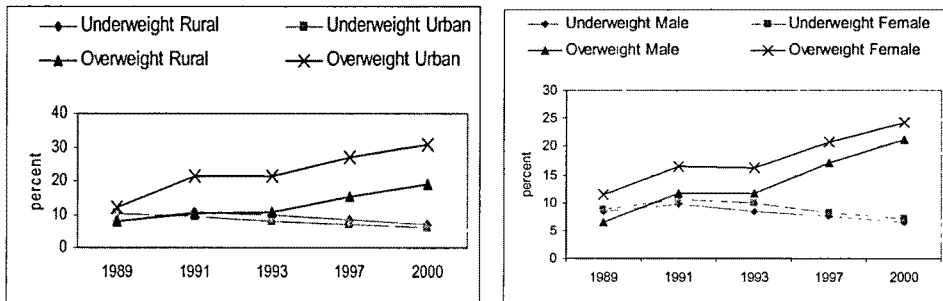


Figure 2. Nutrition status of adults by urban/ rural residence and gender

The distribution of BMI estimated from this survey in 1989, 1997 and 2000 was shown in Figure 3 and Figure 4. It's clear that the prevalence of overweight and obesity will increase more rapid than before if we do not act now.

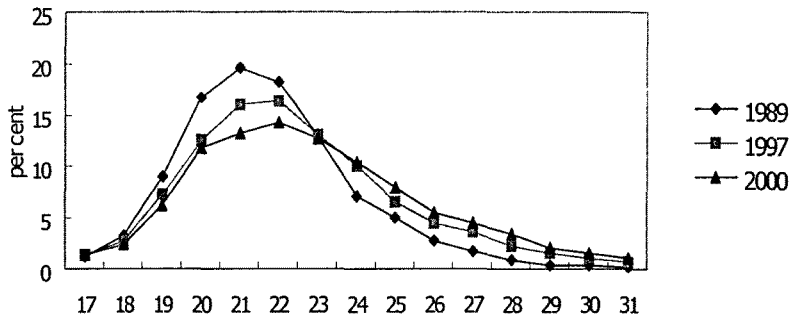


Figure 3. Changes in distribution of adult

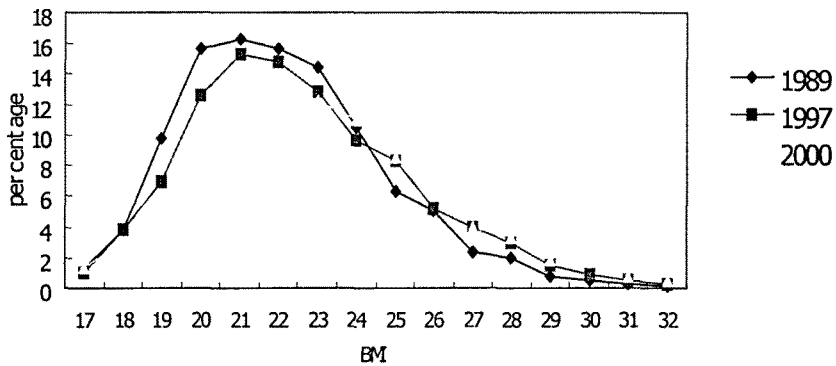


Figure 4. Changes in distribution of adult female BM

3. Survey on the status of nutrition and health of the Chinese

a) Food consumption

The average food consumption per reference man per day based on the whole nation was showed Table 5. During the past 20 years, the intake of cereals of the Chinese people showed a downward trend, and in comparison with the results of the Chinese Nationwide Nutrition Survey (CNNS) in 1982[unpublished data]. There was a slight decrease of vegetables intake in urban and rural areas. Compared with the figures of 1982, the consumption of fruits among the urban people has not been significantly changed, but that of the rural people increased. The intake of dry legume was stable and that of legume products was increased slightly during the past 20 years (Keyou G 1996).

The meat and fishery consumptions in 2002 were increased rapidly compared with that in 1982 and 1992. The milk intake of the urban people has been increased significantly. The vegetable oil intake in the people living in the urban areas has been increased in 2002. The edible oil intake also increased among the rural area, the vegetable oil consumption has been increased since 1982, but the intake of animal oil was increased slightly. Compared with the figures of 1992, the average intake of salt and soy sauce per reference man per day in the whole nation has been decreased.

Table 5. Average food consumption of Chinese people in 1982, 1992, and 2002(g per reference man per day)

	Total			Urban			Rural		
	1982	1992	2002	1982	1992	2002	1982	1992	2002
Total cereal	510	440	402	459	405	366	531	486	416
Rice/Product	217	227	238	217	223	218	217	256	246
Wheat/Product	189	179	140	218	165	132	177	189	144
Other cereal	104	35	24	24	17	16	137	41	26
Starch tuber	180	87	49	66	46	32	228	108	56
Total legume	13	11	16	14	13	15	13	10	16
Dry legume	9	3	4	6	2	3	10	4	5
Legume product	5	8	12	8	11	13	3	6	11
Total vegetable	316	310	276	302	319	252	322	307	286
Dark color vegetable	79	102	91	68	98	88	84	107	92
Light color vegetable	237	208	185	234	221	164	238	200	194
Salted vegetable	14	10	10	12	8	8	15	11	11
Fresh Fruit	37	49	45	68	80	69	24	32	36
Nuts	2	3	4	4	3	5	2	3	3
Total animal food	53	102	132	99	174	183	33	66	112
Poultry/Meat	34	59	79	62	101	105	23	38	69
Egg/Product	7	16	24	16	29	33	4	9	20
Fishery product	11	28	30	22	44	45	7	19	24
Milk/Product	8	15	27	10	36	66	7	4	11
Total oil	18	30	42	26	37	44	15	26	41
Vegetable oil	13	22	33	21	32	40	9	17	30
Animal oil	5	7	9	5	5	4	6	9	11
Sugar/Starch	5	5	4	11	8	5	3	3	4
Salt	13	14	12	11	13	11	13	14	12
Soy sauce	14	13	9	33	16	11	7	11	8
Alcohol	4	2	2	4	2	2	4	2	2

b) Energy and nutrients intake

The average intake of energy and nutrients per reference man per day based on the whole nation showed in Table 6. The energy intake per reference man per day has been decreased compared with the figure of 1982 and that of 1992. The protein intake in the urban area was decreased slightly. The nutrition status related to the protein was improved because the good quality protein in the diet in 2002 was increased. The fat consumption was increased rapidly. During the past 20 years, the carbohydrate intake was decreased steadily.

In comparison with the intakes of retinol equivalent, the figures of 2002 was decreased in the urban areas and increased in the rural areas, the daily intakes of niacin, thiamin, and ascorbic acid showed downward trends. The vitamin E intake in the rural areas has been increased slightly. The minerals including potassium, sodium, magnesium, phosphorus, manganese and calcium were increased compared with the results of 1992. The consumption of selenium in urban areas was decreased and unchanged in rural areas.

Table 6. Average nutrients intake of Chinese people in 1982, 1992, and 2002(g per reference man per day)

	Total			Urban			Rural		
	1982	1992	2002	1982	1992	2002	1982	1992	2002
Energy (kcal)	2491.3	2328.3	2250.5	2450.0	2394.6	2134.0	2509.0	2294.0	2295.5
(KJ)	10423.6	9741.6	9416.1	10250.8	10019.0	8928.7	10497.7	9598.1	9604.4
Protein (g)	66.7	68	65.9	66.8	75.1	69.0	66.6	64.3	64.6
Fat (g)	49.0	58.3	76.2	68.3	77.7	85.5	39.6	48.3	72.7
CHO (g)	447.1	378.4	321.2	390.1	340.5	268.3	471.2	397.9	341.6
Fiber (g)	8.1	13.3	12.0	6.8	11.6	11.1	8.7	14.1	12.4
Retinol (μg)	81.9	156.5	151.1	108.9	277.0	223.6	31.5	94.2	123.1
Ret. EQ (μg)	655.2	476	469.2	515.2	605.5	547.2	764.8	409.0	439.1
Thiamin (mg)	2.5	1.2	1.0	2.1	1.1	1.0	2.6	1.2	1.0
Riboflavin (mg)	0.9	0.8	0.8	0.8	0.9	0.9	0.9	0.7	0.7
Niacin (mg)	-	15.7	14.7	-	16.9	15.9	-	15.0	14.2
Vitamin C (mg)	129.4	100.2	88.4	109.0	95.6	82.2	138.0	102.6	90.8
Vitamin E (mg)	-	32.2	35.6	-	37.4	37.3	-	29.5	35.0
- α (mg)	-	7.5	8.2	-	8.4	8.3	-	7.0	8.1
- β + γ (mg)	-	11.8	14.3	-	15.5	16.0	-	9.9	13.6
- δ (mg)	-	5.1	6.1	-	7.0	7.0	-	4.2	5.8
Potassium (mg)	-	1871.3	1700.1	-	1886.3	1722.4	-	1863.5	1691.5
Sodium (mg)	-	7116.4	6268.2	-	7258.8	6007.7	-	7042.9	6368.8
Calcium (mg)	694.5	405.4	388.8	563.0	457.9	438.6	750.0	378.2	369.6
Phosphorus (mg)	1623.2	1057.8	978.8	1574.0	1077.4	973.2	1644.0	1047.6	981.0
Magnesium (mg)	-	356.8	308.8	-	338.5	291.8	-	366.3	315.3
Iron (mg)	37.3	23.4	23.2	34.2	25.5	23.7	38.6	22.4	23.1
Manganese (mg)	-	7.8	6.8	-	7.3	5.9	-	8.1	7.1
Zinc (mg)	-	12.0	11.3	-	13.2	11.5	-	11.4	11.2
Copper (mg)	-	2.4	2.2	-	2.6	2.3	-	2.4	2.2
Selenium(μg)	-	42	39.9	-	52.3	46.5	-	36.7	37.4

c) Malnutrition and DR-NCDs

The malnutrition prevalence among the children was significantly decreased. The prevalence of growth retardation among children under the age of 5 was 14.3%, compared with the figure in 1992. The prevalence of anemia among Chinese was slightly decreased. In Chinese adults, the prevalence of hypertension is 18.8%. The diabetic prevalence in the big cities increased from 4.6% to 6.4%, and the prevalence in the small and medium sized cities increased from 3.4% to 3.9%. The prevalence of overweight was 22.8% and obesity was 7.1%. It's estimated that the number of overweight and obesity was 200 million and over 60 million respectively. Children's obesity rate has reached 8.1%, hence requires more close attention.

Summary and Conclusions

In the past twenty years, China has achieved remarkable economic progress and high levels of education. With the prosperous economy, the status of diet and nutrition among the urban and rural Chinese population has been improved significantly. Low

consumption of dairy and soy products remained a common problem in China. Micro nutrition deficiency such as calcium, iron and vitamin A is a commonly existed among the urban and rural population.

China is undergoing a remarkable, but undesirable, rapid transition towards a stage of the nutrition transition characterized by high rates of DR NCDs in a very short time. The consumption of meat and oil is too high, and cereals consumption is at a relatively low level. Low consumption of dairy and soy products remains a common problem in China. People's dietary pattern is going away from the balance diet to "high energy density" diet. High dietary energy, high dietary fat, high salt intake and less physical activity are closely related to the occurrence of overweight, obesity, type 2 diabetes, hypertension and abnormal blood lipid level. China is facing simultaneous challenges of under and over nutrition.

Chinese Government has invested a great deal to social development in 1990s, and by cooperation with UN agencies, many national programs have been implemented, such as the Child Development Program for 1990s, National EPI Program, Water Resource Program, Poverty Alleviation Program, IDD Control Program, Maternal Child Health Program etc. The governments' efforts to reduce nutrition problems have been very successful to create the initial stages of systematic attempts in the past decades. In the health sector, efforts related to reducing hypertension and diabetes are becoming more widespread. These efforts, which focus on both under and overnutrition, include the new Dietary Guidelines for Chinese residents, the Chinese pagoda and the National Plan of Action for Nutrition in China. Systematic national prevention programs are underway in China. A broader National Plan of Prevention and Control of DRNCD was issued in 1996 and integrated intervention activities in 24 demonstration sites in 17 provinces. Non

balanced diet was included in the project (Ministry of Health 1994). The Ministry of Health also issued a national plan to prevent and control diabetes and cardiovascular diseases in 1996. The National Guideline for the Prevention and Control of Hypertension was established in 1998 which to guide patients with hypertension in controlling blood pressure with diet and medicine (Ministry of Health 1998a; Zhai F et al. 2002).

There are selected agricultural sector activities that are laudable and few other systematic efforts that are impacting behaviors. A series of joint agriculture - nutrition commissions and efforts have been launched, beginning with a joint 1990 international meeting on nutrition and agriculture sponsored by CAPM, INFH, the Ministry of Health and the Ministry of Agriculture (Ministry of Agriculture 1990).

Today, we still need the efforts such as the nutrition education to promote the principle of Dietary Guidelines for Chinese residents. We should widely publicize the dietary guideline of Chinese for the people, advocate balance diet intake and reasonable nutrition, induct the correct food consumption, advance healthy lifestyle, and improve the national nutrition status in order to prevent the chronic disease related to dietary intake.

To the poor area, further invest to nutrition at low cost to meet the goal of dietary adequacy is an issue of basic needs of economic development, and health promotion as well. It is an important issue with impact on the productivity of the current labor force

and the potentials of mental and physical development of labor force in the future. So it is an issue of the quality of manpower resources. It is the time now to take “invest on nutrition” on the agenda of further implementation of the Poverty Alleviation Program of the country.

China government will improve people’s nutrition status and prevention the chronic diseases through nutrition law, policy support, market guidance and mass education.

References

1. Chinese Statistical Yearbook(1980-2000)
2. Chen Chunming, He Wu, Fu Zhenying. (2004) : Ten year tracking nutritional status in China. *People’s Medicine Publishing House* : 1-106
3. Chinese Nutrition Society(2000) : Chinese Dietary Reference Intakes. *Chinese Light Industry Publishing House*
4. Fengying Zhai, Huijun Wang, S.Du, K.Ge, B.M.Popkin (2002) : The changing trend of dietary pattern of Chinese population: An eight provinces case study in China. *Acta Nutritimenta Sinica* 24(4):6-10
5. F Zhai,D Fu, S Du,K Ge, C Chen, BM Popkin (2002) : What is China Doing in policy-making to push back the negative aspects of the nutrition transition? *Public Health Nutrition* 5(1A): 269-273
6. Hui jun Wang, Fengying Zhai, Shufa Du, Keyou Ge ,Barry m Popkin (2003) : The changing trend of Dietary fat intake of Chinese population An Eight provinces case study in China. *Acta Nutritimenta Sinica* 25(1) : 234-238
7. Keyou G (1996) : The Dietary and Nutritional Status of Chinese Population(1992 National Nutrition Survey). *People’s Medical Publishing House*
8. Ministry of Health (1994) : Document of Ministry of Health.Beijing
9. Ministry of Health (1998a) : Document of Ministry of Health. Beijing
10. Ministry of Agriculture (1990) : Food and Nutrition in China. Beijing
11. Popkin BM, Horton S, Kim S, Mahal A, Shuigao J (2001) : Trends in diet, nutritional status, and diet related noncommunicable diseases in China and India: the economic costs of the nutrition transition. *Nutr Rev* 59: 379-390
12. Population Census Office under The State Council, Department of Population, Social, Science and Technology Statistics of National Bureau of Statistics of China (2000) · abulation on The 2000 Population Census of The People’s Republic of China. *China Statistics Press UNDP* (2004)
13. Shufa Du, Tom A.Mroz, Fengying Zhai, Barry M. Popkin(2004) : Rapid income growth adversely affects diet quality in China-particularly for the poor!. *Social Science & Medicine* 59(7).1505-1515
14. Yuexin Y, Guangya W, Xingchang P (2002) : China Food Composition. *Medical Publishing House of Beijing University*