

Children's Height in China in The Past Half Century

Mori H*

Professor Emeritus, Senshu University, Tokyo, Japan

*Corresponding author:

Hiroshi Mori,
Professor Emeritus, Senshu University, Tokyo,
Japan

Received: 01 Aug 2023

Accepted: 06 Sep 2023

Published: 14 Sep 2023

J Short Name: ACMCR

Copyright:

©2023 Mori H. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and build upon your work non-commercially

Citation:

Mori H, Children's Height in China in The Past Half Century. Ann Clin Med Case Rep. 2023; V11(5): 1-8

1. Abstract

China was very poor for more than a few decades after WWII and was hit by severe famines in the end of the 1950s and the early-60s. Its economy started to make remarkably rapid progress in the 1980s to become nearly equivalent to the other north-eastern countries, Japan and South Korea, toward the end of the last century. As the standard of living improved, children increased in mean height to overtake the Japanese peers in the turn of the century. As regards per capita supply of animal protein, China is still conspicuously behind South Korea but consumes nearly twice as much vegetables, as compared to their Japanese and South Korean peers. Likely due to the great disparities in standard of living by regions, children in south-western China are still shorter than their Japanese peers.

2. Introduction

School children in China may have overtaken in mean height those in Japan and South Korea in the latest decade or so. China has made remarkably big economic developments in the past decades in terms of per capita GDP, whereas Japan's economy, in particular, has stagnated since the end of the past century. China was very poor in the post-war decades and the country was hit by very severe famines in the end of the 1950s and the beginning of the 1960s. In terms of per capita GDP (in 2015 US\$), China's was \$287 in 1970-71, as compared to \$2,036 in South Korea and \$14,083 in Japan in the same years and was \$661 in 1985, as compared to \$5,889 in S. Korea and \$22,867 in Japan, respectively [1] (United Nations, FAO). Prices of basic food products, such as wheat flour, rice, and vegetables should have been very low in

terms of U. S. prices. Nevertheless, ordinary people in China were not rich enough to eat whatever foods they wanted to eat. If children eat more foods, or take more calories with sufficient essential nutrients before they reach late adolescence, they should grow taller to reach their gene potentials [2]. This is the basic biological principle under which they live. Most human biologists contend that animal protein should result in increasing body height, if consumption of essential nutrients is sufficient [3, 4]. However, children in Japan were overtaken in height by their Korean peers in the early 2000s who were consuming less animal protein than the Japanese. Children in Japan ceased to grow taller in the end of the 1980s, possibly because they radically turned away from fruit/vegetable consumption in their diet shortly before 1980, likely reducing the intake of essential nutrients [5]. A case study of school children in Beijing by a group of human biologists demonstrates, that school children in Beijing, boys and girls, grew in height over the period of 1955 to 2010, particularly from the mid-1970s to the mid-1980s. Male high school seniors reached 175.4 cm and female counterparts 163.4 cm in mean height in 2010, as shown in (Table 1), EHB, 21[6].

Graph 1 Height by areas



1: Shandong-Province Capital

Male 175.44cm; Female 169.4cm; 99.3%(Han)



2: Beijing

Male: 175.32cm; Female 167.33cm; 96%(Han)



8: Shanghai, 2015

Male: 173.78cm; Female 163.79cm



3: Liaoning-Province capital

Male: 175.24cm; Female 165.25cm; 84%(Han) Manchuria-13%



9: Jilin - Changchun

Male: 172.83cm; Female 162.84cm; Han- 91% Korean- 4%



4: Heilongjiang-Harbin City

Male: 175.24cm; Female: 165.25cm; 95%(Han)



10: Tenshin

Male: 172.80cm; Female: 162.80cm



5: Nei Menggu

Male: 174.58cm; Female: 164.58cm; Han - 79% Mongol- 17%



11: Shanxi - Talyuan

Male: 172.73cm; Female 162.74cm; (Han)Mongle



6: Hebel-Shijianzhuhg

Male:174.49cm; Female 164.50cm; Han-96%(Han)



12: Shaanxi -Xian

Male:172.72cm; Female:161.80cm; Han 99.5%



7: Ningxia-Yinchan

Male: 173.98cm; Female 163.96cm; Han- 79% Hun- 20%



13: Macao

Male:171.79cm; Female 161.79cm



14: Gansu - Lanzou
Male: 171.67cm; Female 159.66cm; Han - 91% (Han) Un-5%



19: Fujian- Fuzhou
Male: 170.90cm; Female: 160.89cm; Han- 98%



15: Jiangsu – Nanjing
Male: 171.54cm; Female 161.54cm; Han - 99.6%(Han)



20: Zhejiang -Hangzhou
Male: 170.90cm; Female: 160.88cm; Han - 99.14%



16: Henan - Zhengzhou
Male: 171.49cm; Female-161.47cm; Han- 98.8%(Han)



21: Hong Kong, 2015
Male: 170.89cm; Female 160.93cm



17: Qinghai-Province Capita
Male170.98cm; Female 160.86cm
Han-54% (Han); Tibbet-23%
Hun - 16%



22: Sichuan-Chengdu
Male: 170.86cm; Female160.86cm; Han - 95%



18: Anhui- Hetel
Male: 170.93cm; Female160.90cm; Han - 99%



23: Guangdong -guangzhou
Male: 169.78cm; Female 159.78cm; Han - 99%



24: Chongqing- 2015
Male: 169.71cm; Female 159.71cm



25: Jiangxi-Nanchang
 Male: 169.63cm; Female 159.53cm; Han - 99.7%



29: Yunnan-Kurming
 Male: 169.24cm; Female 159.33cm
 Han-67%(Han)lee11%
 Pei-3.6%Thei-2.7%
 Zhuang -2.7% Tai - 2.7%



26: Haikaou-
 Male: 169.60cm; Female 159.56cm;
 Han- 82.6%; Lee-15.84%



30: Hunan-Changsha
 Male :168.99cm; Female159.10cm; Han- 90% Toucha-4%



27: Hubel- Wuhan
 Male: 169.54cm; Female 159.56cm; Han - 95.6% Touch-3.7%



31: Guangxi -Narning
 Male: 168.96cm; Female 159.00cm; Han-62% Minority-38%



28: Guizhoy-Guyang
 Male: 169.53cm; Female 159.36cm; Han- 62% Myao-12%
 Miyao - 12%; Pui - 8%

Graph 1: Mean height by Provinces in China, 2015, upload. Wikimedia.org.

Table 1: Secular changes in mean height of school children in Beijing, 1955 to 2010.

Boys							(cm)
Age	1955	1965	1975	1985	1995	2005	2010
7	118.6	120.3	123.0	124.8	124.8	128.2	129.5
8	121.8	123.6	127.5	128.6	131.1	133.7	135.0
9	127.3	129.4	132.0	135.0	136.3	139.3	139.8
10	132.5	134.4	135.6	139.9	141.9	145.0	146.2
11	135.8	138.1	139.9	144.5	147.9	151.5	150.3
12	142.4	143.4	146.1	150.2	153.6	158.1	159.6
13	148.0	149.5	152.0	159.4	162.8	164.5	165.8
14	155.5	156.7	158.1	166.6	167.8	170.4	171.7
15	161.0	162.2	163.7	170.4	171.0	172.5	174.9
16	165.3	166.0	168.0	171.6	172.5	173.5	174.8
17	166.7	168.8	168.7	173.1	173.4	173.5	175.4
Girls							
Age	1955	1965	1975	1985	1995	2005	2010
7	117.9	119.1	121.9	122.9	124.6	126.4	128.1
8	121.1	122.3	126.8	128.4	130.0	132.8	133.1
9	126.3	127.7	131.3	133.5	136.6	137.8	138.8
10	131.8	133.0	137.4	140.3	141.7	145.8	146.1
11	136.2	139.0	142.8	147.8	148.3	151.1	152.1
12	143.1	145.0	148.9	152.8	153.3	156.2	158.0
13	149.0	150.9	152.4	158.3	158.9	159.2	160.8
14	152.5	154.8	154.4	159.2	160.2	160.2	161.6
15	153.8	156.9	156.8	159.7	160.8	161.6	162.3
16	155.6	157.2	158.7	160.7	160.1	160.9	163.4
17	156.7	158.0	157.7	161.1	160.8	162.5	162.6

Source: Ruoran Lu, Yi Song et al., Table 1, p. 212.

3. Secular Trends in Students' Height in Beijing in the Past Half Century

China is very large in area, equivalent to all of Europe. It is widely known that people in northern China are substantially taller in mean height than those in the southern area. Is this related to genetics or differences in the standards of living and/or the old theory of climatical circumstances? The author was stunned only a few months ago to realize that male birth cohorts of the mid-1990s in the north-eastern area, including Beijing, are 175 cm in mean height in 2015, more than 5 cm taller than those in the south-western area. The author learned that the great majority of people are Han in race, regardless of the area of residence [Graph 1 shown above]. As readers have seen in the graphs of this note, males are below 170.0 cm and females are below 160.0 cm, respectively in seven provinces in the south-western China and males are between 170.0 to 172.0 cm in 12 provinces in southern provinces. Beijing is the nation's capital, one of the richest cities since the end of WWII in China. As briefly mentioned earlier, the entire of China experienced extensive "great famines" in the end of the 1950s and the beginning of the 1960s. In 1961-62, per capita caloric supply from foods ("grand total"), was 1,471 kcal/day in China, substantially

lower than in South Korea, 2,160 kcal/day in the same years. Agricultural production increased steadily in China and yet per capita caloric supply was 2,129 in 1979-81, 30% lower than in South Korea. In regard to animal protein, a key factor for human height, per capita caloric supply from animal products, in 1961-62, was 57 kcal/day in China, only 22% the level of Japan. Animal products increased quickly to 161 kcal/day in China in 1979-81 but 30% the level of Japan. In the beginning of the current century, animal products reached 500 kcal/day in China, but still 20% less than in Japan and less than a half the level in France [7].

Frankly, it is almost impossible for the author to accept that male high-school seniors, 17 years of age, in Beijing were 168.8 cm in the mid-1960s. Their counterparts in South Korea were 163.3 cm and their Japanese peers were 165.6 cm in 1961-63, respectively [8, 9]. Per capita caloric supply from grand total of foods was 1,805 kcal/day in 1970 in China, as mentioned above, whereas S. Korea consumed 2,812 kcal/day in the corresponding period. Freshman in primary school, 7 years of age, in Beijing grew from 120.3 to 123.0 from 1965 to 1975, whereas 2nd graders, 7 years of age, in S. Korea grew from 115.2 to 118.5 over the same period of time. Young children in China, the starving country were tall and

grew steadily in height, before the 1980s. People in China were belatedly well fed in food calories in the mid-1990s, if not in calories from animal products [7]. The school surveys of students' stature in Beijing for the period of 1955-75 were conducted by the Beijing Center for Disease Control and Prevention, from families residing in Beijing's Haidian District (high GDP), Dongcheng District (middle GDP), and Xuanwu District (low GDP). The paper does not specify the ratios in weight in determining average height, by age in Beijing. In following secular changes in children's height over time in a selected country or between countries, the author has found the standards of living, or relative incomes to be key determinants. In discussing changes and or differences in mean height, researchers can't be excessively careful in estimating real incomes.

4. Regional Big Disparities in Standard of Living May Still Exist

Statistics on school children's height by age from 7 to 18 years have been published by Chinese government, Ministry of Education, every five years, since 1985 to 2019: Chinese National Survey on Students' Constitution and Health [10], summary table of which is reproduced in (Table 2). Mean height of 17 years old boy in 1985 is 173.1 cm in (Table 1), from EHB 21, as compared to 167.5 cm in (Table 2), based on CNSSCH in the same year. Mean height of 7 years old boy in 2010 is 129.5 cm in (Table 1), as compared to 125.5 cm in 2010 in (Table 2), CNSSCH. One

more example is the case of 12 years old boy in 1995: 153.6 cm in (Table 1), whereas CNSSCH provides 148.2 cm in the same year: substantial, consistent differences between the two data sources, in favor of Beijing surveys.

One may think of two reasons. The surveys by the Beijing Center for Disease Control and Prevention may be upward-biased, selecting, for example, the wealthier families in the city. The more fundamental reason should be that Beijing, a nation's capital city, has long been overwhelmingly rich in per capita GDP. In Japan and South Korea as well, there existed large disparities between big cities and rural areas but measurable disparities between urban and rural and among regions seem to have almost disappeared. Graph 1, Mean Height of Chinese by Provinces, 2015, may clearly demonstrate that there still exist great disparities in living standard by regions.

As regards nation's per capita supply of foods, China is not behind Japan and South Korea in the 2010s (Table 4). The author would not agree with human biologists who assume that the average height of 17-year-old boys was 175.37 cm, not quite that of their American counterparts (176.3 cm) but greater than that of 17-year-old boys in European countries lying along roughly the same latitude as Beijing. As for the 17-year-old girls in the study, the trend was the same, with one exception: there was "no significant difference between their average height and that of their American counterparts" [6, p214].

Table 2: Students' mean height by age in China, 1985 to 2014, CNSSCH.

	1985 Male		1995 Male		2000 Male		2005 Male		2010 Male		2014 Male	
Age	Height(cm)		Height(cm)		Height(cm)		Height(cm)		Height(cm)		Height(cm)	
	S		S		S		S		S		S	
7	119.51	5.53	122.23	5.87	122.58	6.23	124.15	6.14	125.52	5.99	126.62	5.79
8	123.96	5.78	126.74	6.24	128.12	6.22	129.52	6.44	130.74	6.17	131.97	6.07
9	128.86	6.1	131.84	6.44	132.93	6.59	134.44	6.54	135.81	6.57	137.18	6.46
10	133.51	6.23	136.85	6.95	137.98	6.85	139.33	6.86	140.88	6.95	142.09	6.9
11	138.27	6.71	142.31	7.6	143.05	7.47	144.74	7.67	146.25	7.87	148.08	7.89
12	142.92	7.55	148.23	8.53	149.13	8.77	150.56	8.65	152.39	8.86	154.54	8.79
13	151.02	8.55	156.26	8.84	157.05	9.25	157.92	9.05	159.88	8.66	161.4	8.62
14	157.25	8.46	161.94	8.17	162.69	8.41	163.74	8.28	165.27	7.81	166.48	7.64
15	162.29	7.46	165.66	6.88	166.82	7.07	167.73	7.08	168.75	6.96	169.79	6.79
16	165.76	6.29	167.95	6.35	169.23	6.41	169.75	6.5	170.53	6.43	171.35	6.32
17	167.54	6.02	168.94	6.08	170.2	6.24	170.78	6.39	171.39	6.29	172.05	6.29
18	168.21	5.9	169.31	6.01	170.25	6.34	171	6.29	171.42	6.32	172	6.27
	1985 Female		1995 Female		2000 Female		2005 Female		2010 Female		2014 Female	
Age	Height(cm)		Height(cm)		Height(cm)		Height(cm)		Height(cm)		Height(cm)	
7	118.47	5.45	121.13	5.79	121.6	6.12	122.65	6.07	124.13	5.93	125.13	5.64
8	123.12	5.91	126.1	6.12	126.91	6.42	128.28	6.3	129.4	6.23	130.48	6.06

9	128.31	6.34	131.45	6.8	132.54	6.91	133.8	6.89	135.02	6.82	136.3	6.59
10	133.79	7.02	137.53	7.47	138.62	7.48	139.81	7.5	141.25	7.37	142.64	7.26
11	139.74	7.53	143.94	7.87	144.85	7.77	146.08	7.79	147.24	7.72	149.34	7.53
12	145.08	7.51	149.69	7.22	150.22	7.36	150.83	7.37	152.16	7.18	153.74	6.93
13	151.47	6.36	154.14	6.17	154.32	6.38	154.91	6.37	155.99	6.17	157.04	6.14
14	153.99	5.77	155.93	5.75	156.59	5.87	156.97	5.93	157.79	5.8	158.65	5.84
15	155.43	5.41	156.98	5.6	157.63	5.64	157.95	5.72	158.54	5.73	159.38	5.74
16	156.44	5.38	157.62	5.55	158.34	5.68	158.57	5.67	159.03	5.66	159.76	5.81
17	156.97	5.28	157.88	5.52	158.54	5.69	158.96	5.71	159.29	5.71	159.83	5.77
18	157.1	5.28	157.9	5.49	158.42	5.59	158.94	5.58	159.19	5.66	159.4	5.81

Sources: Ministry of Education, China National Survey of Students' Constitution and Health, various issues. Courtesy: Dr. Song Yi.

Table 3: Changes in per capita food calories 1961~1985: FAOSTAT, Food Balance Sheets (kcal/day).

	China	Japan	S. Korea
1961	1415	2525	2141
1962	1526	2572	2179
1963	1594	2608	2208
1964	1666	2631	2251
1965	1797	2620	2367
1966	1865	2641	2440
1967	1817	2689	2508
1968	1758	2699	2610
1969	1731	2698	2722
1970	1840	2737	2816
1975	1909	2716	3106
1980	2146	2798	3025
1985	2429	2861	2951

Sources: FAOSTAT, Food Balance Sheets, various issues.

Table 4: per capita caloric supply of grand total and animal products, Cn, Jp, Kr, France, Indonesia, 1963-2008 (kcal/1day).

Years	China	France	Indonesia	Japan	S. Korea
		Grand Total			
1963	1595	3237	1835	2604	2213
1973	1873	3265	2055	2765	3020
1983	2387	3440	2366	2823	2963
1993	2533	3535	2439	2934	2979
2003	2841	3599	2463	2846	3079
2008	2963	3516	2556	2742	3176
		Vegetal Products			
1963	1512	2203	1780	2318	2151
1973	1747	2077	1995	2300	2882
1983	2201	2152	2279	2266	2710
1993	2174	2186	2312	2316	2592
2003	2289	2267	2328	2256	2610
2008	2315	2314	2398	2181	2648
		Animal Products			
1963	83	1034	55	286	62
1973	126	1188	61	465	139
1983	186	1288	87	556	254
1993	358	1348	128	617	387
2003	552	1333	136	589	469
2008	649	1202	158	561	529

Sources: FAOSTAT, Food Balances, Internet. Year represents 3 year moving averages.

5. Brief Conclusions

There exist vast disparities in terms of standards of living among big cities and predominantly rural areas and between North and South-Western regions in China. As shown in (Table 4), Mainland China is close to South Korea and Japan in respect of per capita supply of meat in the mid-2010s [7]. In a large country, equivalent to all of Europe, average statistics of simple per capita supply of any products classified by a single nation means little.

Stature is a net measure that captures not only the supply of inputs to health but demands on those inputs [11]. A high consumption of animal protein does not result in increasing body height if overall consumption of calories and other essential nutrients is insufficient [4]. With respect to average height of young adults, males and females as well, Hong Kong is ranked 21st of 31 provinces in 2015, 5 cm shorter than Shandong and Beijing, whereas per capita meat consumption in Hong Kong is twice as much as mainland China (Table 5).

Table 5: Per capita supply of meat, fruit, vegetables, 2010-2020 (kg/year).

	Cn_Main	Hong Kong	Japan	Korea
		meat		
2010	57.2	125.9	45.6	57.2
2015	60.2	117.5	46.1	70.1
2020	61.3	136.3	53.4	78.5
		vegetable		
2010	322.0	98.5	101.8	196.1
2015	361.3	121.3	93.9	192.2
2020	380.4	130.8	94.3	192.1
		fruit		
2010	75.3	63.5	45.6	55.7
2015	93.4	73.8	46.1	52.1
2020	99.3	67.6	53.4	47.0

Sources: FAOSTAT, Food Balance Sheets, 2010-20.

6. Acknowledgment

The author is grateful to Mr. John Dyck, who was an economist at the Economic Research Service, U.S. Department of Agriculture, for his valuable comments and thorough editing.

References

1. United Nations, FAO, on the internet.
2. Kopczyński, Michał. Body height as a measure of standard of living: Europe, America and Asia, *Roczniki Dziejow Społecznych i Gospodarczych* Tom LXXVI-39-60, 2016.
3. Baten J, Blum M. Why are you tall while others are short? Agricultural production and other proximate determinants of global heights. *European Review of Economic History*. 2014; 18: 144-65.
4. Blum M. Cultural and genetic influences on the 'biological standard of living', *Historical Method*. 2013; 46(19): 19-30.
5. Mori H. Structural changes in food consumption and human height in East Asia, PART II, Lambert Academic Publishing, Berlin, 2020; 1-156.
6. Ruoran L, Song Yi. Secular growth trends among children in Beijing, 1955 to 2010, *Economics and Human Biology*. 2016; 21: 210-2010.
7. United Nations, FAOSTAT, Food Balance Sheets, 1961-2013, old methodology.
8. Republic of Korea, Department of Education, Center for Educational Statistics, *Statistical Yearbook of Education*, various issues.
9. Japanese Government, Ministry of Education and Science, National School Health Examination Surveys, various issues.
10. Government of China, Ministry of Education, Chinese National Survey of Students' Constitution and Health, 1985 to 2019.
11. Steckel, Richard, Stature and the standard of living, *Journal of Economic Literature*, XXXIII, 1903-1940, 1995.