

Statures in Han populations of China

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Dear Editor,

Shortly after initiating the “Physical Anthropological Research on Han Chinese” research project, we applied uniform sampling methods as well as methods and instruments of measurement to obtain a complete set of measurements of physical anthropological indicators among Han populations across China. Among these measurements, body stature was a key indicator. Currently, there should be reliable and complete basic data of stature around the Chinese people. We analyzed the current status of statures among Han adults.

During the period from 2009 to 2013, a total of 16,501 rural Han adults (8,174 males and 8,327 females) and 10,451 urban Han adults (5,048 males and 5,403 females) residing in 22 provinces were enrolled in this study.

In accordance with the methods described by Xi and Chen [1], anthropometers were used to measure stature.

Overall, the statures of northern rural and urban Han populations were greater than those of their southern counterparts. However, the statures of male and female populations in the Jianghuai and Jiangnan Plains were greater than those of some of the northern Han populations.

Whereas the majority of male populations living in rural

areas are of “medium” stature (1640–1669 mm; Table 1), more than half of urban male populations are of “ultra-medium” stature (1670–1699 mm; Table S1 in Supporting Information).

Based on the combined analysis on female stature, we can conclude that most rural populations are of “medium” stature (1530–1559 mm) and that most urban populations are of “ultra-medium” stature (1560–1589 mm; Tables S2 and S3 in Supporting Information). Whereas most urban populations located in the northern cities are of “ultra-medium” stature, northern rural populations and southern urban populations are of “ultra-medium” or “medium” stature. Finally, the majority of southern rural populations are of “medium” or “sub-medium” stature (1490–1529 mm).

The 20–44-year age group represents the current stature of young and middle-aged adults. In the three age groups, the 20–44-year age group is the highest. In the 20–44-year age group, about 11% of rural males, 40% of urban males, and 30% of urban females were of tall stature, whereas no “tall” rural females in this age group were identified. Also in this age group, both male and female populations in six northern cities (Jinzhou, Elm, Harbin, Weifang, Baoding, and Xi’an) and two southern cities (Huai’an and Fuzhou) were classified as “tall.”

Correlation analysis showed a negative correlation in almost every population group of rural males and females and urban males, and females ($0.01 < P < 0.05$ or $P < 0.01$),

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Table 1 Mean height values of rural males of Han in China (mm, mean±SD)^{a)}

No.	Measurement areas	20–44-year group		45–59-year group		60–80-year group		Total		Correlation analysis		Variance analysis	
		No.	Stature	No.	Stature	No.	Stature	No.	Stature	<i>r</i>	<i>P</i>	<i>F</i>	<i>P</i>
1	Harbin	102	1696.6±58.7	58	1655.6±65.0	40	1657.9±48.3	200	1676.9±61.7	-0.41**	0.00	11.62**	0.01
2	Yushu	73	1703.4±58.6	75	1657.9±54.1	37	1648.0±61.6	185	1673.9±61.8	-0.45**	0.00	16.28**	0.00
3	Ulanhot	132	1674.4±52.6	78	1642.2±55.5	46	1634.0±45.3	256	1657.4±55.2	-0.32**	0.00	13.35**	0.00
4	Changtu	116	1680.6±54.4	75	1663.9±58.0	54	1645.6±58.5	246	1667.7±57.8	-0.28**	0.00	7.38**	0.00
5	Jinzhou	114	1686.8±61.1	75	1662.4±47.6	51	1626.7±57.1	242	1666.5±60.7	-0.44**	0.00	20.42**	0.00
6	Zhangjiakou	248	1695.8±66.6	152	1660.7±59.1	100	1652.5±48.7	500	1676.5±54.9	-0.39**	0.00	25.25**	0.00
7	Baoding	93	1720.8±55.2	55	1669.7±50.0	36	1667.3±53.7	185	1700.2±57.5	-0.30**	0.00	16.23**	0.00
8	Jinzhong	123	1679.3±59.6	78	1655.0±58.3	48	1626.5±54.2	251	1660.5±62.6	-0.41**	0.00	14.95**	0.00
9	Weifang	104	1687.9±58.4	108	1664.9±54.5	56	1659.1±60.9	272	1672.0±58.4	-0.22**	0.00	4.76**	0.01
10	Nanyang	131	1678.8±64.0	69	1649.8±61.5	50	1641.7±77.6	250	1663.4±68.0	-0.36**	0.00	26.91**	0.00
11	Xinye	124	1692.0±64.0	76	1653.1±50.9	50	1632.5±50.1	250	1668.3±62.5	-0.42**	0.00	22.79**	0.00
12	Pucheng	129	1686.8±53.9	72	1661.4±51.2	50	1637.0±57.8	251	1669.6±57.0	-0.20**	0.00	16.02**	0.00
13	Fuping	120	1698.8±52.5	82	1701.1±60.9	47	1661.6±60.2	252	1691.7±58.9	-0.33**	0.00	8.63**	0.00
14	Pingliang	129	1680.9±54.6	74	1673.4±63.6	46	1653.9±55.2	250	1672.5±59.4	-0.23**	0.00	5.39**	0.005
15	Wuwei	133	1670.2±54.9	70	1644.6±61.6	47	1629.3±56.6	251	1655.2±59.4	-0.33**	0.00	10.59**	0.00
16	Jingmen	93	1678.7±52.4	64	1650.9±53.6	40	1620.5±68.3	197	1657.9±60.4	-0.42**	0.00	20.27**	0.00
17	Jingzhou	89	1682.4±64.1	64	1646.3±65.6	39	1622.5±63.5	192	1658.2±69.4	-0.40**	0.00	13.32**	0.00
18	Chengdu	116	1648.2±46.3	68	1606.5±41.3	38	1583.7±47.1	222	1624.4±63.0	-0.46**	0.00	22.73**	0.00
19	Ziyang	104	1661.4±53.4	61	1605.3±56.0	37	1561.0±44.7	205	1624.2±69.0	-0.67**	0.00	57.00**	0.00
20	Anshun	125	1644.4±59.3	76	1617.7±57.7	50	1593.1±69.0	251	1626.1±63.8	-0.36**	0.00	12.09**	0.00
21	Kunming	110	1678.2±56.8	55	1644.5±46.6	41	1632.8±43.4	206	1660.2±66.5	-0.38**	0.00	9.71**	0.00
22	Chuzhou	114	1693.4±63.2	58	1662.7±60.4	29	1636.3±60.3	201	1676.3±65.3	-0.44**	0.00	11.77**	0.00
23	Huai'an	107	1691.1±56.2	57	1670.4±61.6	48	1628.3±56.2	213	1670.7±63.0	-0.43**	0.00	20.88**	0.00
24	Jiaying	77	1707.5±51.9	70	1674.5±48.1	34	1629.5±49.5	188	1677.0±69.7	-0.45**	0.00	23.99**	0.00
25	Shaoxing	76	1686.5±47.9	70	1645.6±64.6	37	1630.2±56.6	186	1657.5±67.6	-0.52**	0.00	15.29**	0.00
26	Jingdezhen	94	1656.1±62.5	61	1618.7±63.8	40	1601.9±52.8	195	1633.3±64.9	-0.39**	0.00	13.57**	0.00
27	Yichun	103	1645.5±64.2	61	1620.4±57.7	37	1573.8±50.9	203	1624.0±65.5	-0.46**	0.00	20.81**	0.00
28	Changsha	100	1653.1±58.4	58	1612.7±54.2	38	1598.4±50.9	197	1630.4±60.2	-0.44**	0.00	17.69**	0.00
29	Loudi	105	1666.0±63.4	53	1614.1±50.9	38	1605.6±68.6	196	1640.2±67.1	-0.46**	0.00	20.08**	0.00
30	Ganzhou	92	1653.0±60.4	54	1640.2±59.6	37	1612.2±51.5	183	1641.0±60.2	-0.26**	0.00	6.43**	0.00
31	Meizhou	73	1672.1±60.7	58	1630.1±67.4	30	1633.9±52.7	162	1649.6±64.6	-0.32**	0.00	8.85**	0.00
32	Fuzhou	83	1704.7±57.7	66	1647.7±54.5	38	1631.7±74.8	188	1669.9±67.9	-0.47**	0.00	25.14**	0.00
33	Zhangzhou	89	1678.1±60.6	49	1642.9±56.0	35	1624.4±59.3	173	1657.2±62.9	-0.43**	0.00	12.39**	0.00
34	Wenchang	93	1682.7±61.4	76	1648.5±72.6	41	1620.0±66.3	216	1656.3±70.3	-0.39**	0.00	16.54**	0.00
35	Qionghai	81	1678.1±62.2	57	1637.3±63.9	34	1621.7±46.1	174	1653.6±64.0	-0.37**	0.00	13.19**	0.00
36	Huazhou	157	1690.5±60.3	130	1641.6±59.4	96	1621.4±58.8	385	1644.4±58.2	-0.52**	0.00	47.36**	0.00

a) The serial number in the table is also the serial number in Figure 1; “*r*” represents the correlation coefficient between stature and age; **, $P < 0.01$.

indicating a linear decrease of stature across all Han populations with age. Analysis of variance showed that all stature differences across age groups in rural males and females and urban males and females were statistically significant ($0.01 < P < 0.05$, or $P < 0.01$), except in the cases of urban males in Zhangjiakou and Nanyang and urban females in Jingmen, Jingzhou, and Shaoxing.

An individual's stature is affected by genetic, environmental, and dietary factors, as well as labor intensity. Of these, genetic factors play a predominant role. Although approximately 1000 years have passed after the Hakka people, who originally lived in northern China, migration of the Han population to the southern region still retained their

physical characteristics of the northern Han [2], indicating the dominant role of genetic factors in the formation of physical characteristics.

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Supporting Information

Table S1 Mean height values of urban males of Han in 31 cities (mm, mean±SD)

Table S2 Mean height values of rural females of Han China (mm, mean±SD)

Table S3 Mean height values of urban females of Han in 31 cities (mm, mean±SD)

Figure S1 Distribution of measurement sites of Han urban adults.

Figure S2 Distribution of measure sites of Han rural adults.

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