Anthropometric Features of Body Index in Natives of Qazvin, Iran

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ABSTRACT

Introduction: The purpose of the present study was to evaluate anthropometric characteristics of weight, sitting & standing height, cormic index and BMI in the adult residents of Qazvin, Iran.

Methods: In this cross-sectional study, 300 adult inhabitants aged 18-55 years (180 males and 120 females) of Qazvin, Iran were evaluated. The participants were selected randomly and without any physical deformities or any previous history of trauma. Measurements were performed in an anatomical position.

Results: Their mean±SD weight was 72.64±11.03 and 66.53±9.48 kg, mean±SD standing height was 171.41±5.33 and 158.24±5.2 cm, mean±SD sitting height was 90.22±4.04 and 86.24±2.45 cm, mean±SD cormic index was 52.51±2.07 and 54.52±1.57 cm and mean±SD BMI was 24.67±3.2 and 26.57±3.64 in males and females, respectively.

Conclusion: The result of the present study showed that the mean dimensions of weight, sitting height and BMI parameters were higher than the most of other accomplished studies.

1. Introduction

Anthropometry is a branch of anthropology which deals with measurement of different parts of human body (1). It would allow quick determination of the body size, proportions and composition without needing for specialized laboratories, radiation exposure or expensive equipments (2, 3). Anthropometry reflects health and nutritional status, economic and social well being and predicts performance, health and survival (1). Measuring different indices, the physical differences among humans can be evaluated. There are some differences in anthropometric dimensions among different ages, genders, races, and ethnicities (4-6). The simplest parameters in anthropometry include height, weight, length, thickness and width of various parts of the body varying in different tribes and races. Height and weight are the anthropometric measurement that most often used to demonstrate associations between nutritional deprivation, poor socioeconomic status, and the risk of chronic health problems in adulthood. Body mass index is an ob-

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jective scientific measurement using height and weight to determine thinness or overweight. Excessive body weight is associated with various diseases particularly cardiovascular diseases, diabetes mellitus, certain types of cancer, premature death and osteoarthritis (1, 7, 8). In a southeastern New England community, short stature was demonstrated to be an independent predictor of cardiovascular disease in men but not in women (9), and was inversely associated with the long-term incidence of fatal stroke (10) and mortality in Korean men (11). Short stature was associated with abdominal obesity (12) and postpartum weight retention only in more developed areas like Brazilian population (13). It is clear that anthropometric data are very important for proper design of workstation, equipment, furniture and decreasing the awkward postures and stresses on human body due to improper design. Mismatch between anthropometric dimensions and consumer products may cause health problems in human body such as musculoskeletal disorders, concentration deficit, and so on. Many countries making great efforts in establishing an anthropometric database for different population groups such as civilians, military personnel, students, and workers (4,5). Physical characteristics and body composition are known to be the fundamental factors for excellent athletic performance. Specific athletic events require different body types and weights for maximal performance (14). This is the first ever comprehensive anthropometric measurement of Qazvin people in Iran aimed to present assessment of the society for recognition weakness a profiteer points. Using this information, the awareness level of the people increased on the basis of how to achieve the health lifestyle and how to restate our disability in achieving a healthy life. This study is designed to evaluate the anthropometric characters of the body among normal natives from Qazvin, Iran. Considering the gender of the individuals, the weight, sitting & standing height, cormic index and BMI measurement were used.

2. Materials & Methods

This cross-sectional study was performed on 300 (180 males and 120 females) adult inhabitants of Qazvin, Iran. Using random sampling method, the subjects were selected. The age range of participants was 18 to 55 years old. There were no physical deformities or any previous history of trauma. The population resided for more than one century in these regions. This study was approved by the ethics committee of Qazvin University of Medical Sciences. The linear dimensions of the body were measured in the anatomical position for sitting & standing height, and weight. In addition, BMI and Cormic index were assessed by standard anthropometric measurements as fallowing:

Weight= body weight determined with no clothes by kilogram. It should be noted that the amount of weight must recorded at least by one decimal precision.

Standing Height= Measurement of length of the human body from the bottom of the feet to the vertex of the head with standing posture without shoes and look straight ahead (Frankfurt position in which the optic axis is parallel to the horizon).

Sitting Height= vertical distance from the head peak to the sitting location point of a person looking straight ahead (Frankfurt position) and knee and ankle is vertical.

Cormic index= sitting standing height ratio multiple 100. Based on the results of cormic index, the person is placed under one of three groups:

1. Cormic index of less than 50.9: this people have a short trunk and long lower extremities as called brachy cormic.

2. Cormic index between 51- 52.9: this people have an average trunk as called methro cormic.

3. Cormic index of higher than 53: this people have a tall trunk and short lower extremities as called macro cormic.

BMI= It is calculated as weight in kilogram divided by the square of height in meter (Table1).

3. Results

The results of the present study shown in Tables as following:

The age status in total and by sex separation was shown in table 2. The mean weight for men and women were 72.64 ±11.03 and 66.53±9.48 kg, respectively, also the mean standing height for males and females were 171.41±5.33 and 158.24±5.2 cm. The mean sitting height for men and women were 90.22±4.04 and 86.24±2.45 cm, respectively (Table 3 and 4). Moreover, the standing height of men and women were shown in table 5. The mean cormic index for men and women were 52.51±2.07 and 54/52±1.57 cm, respectively (Table 6). Furthermore, cormic index descriptive classification criteria for men and women were shown in Table 7. BMI mean for men and women were 24.67 ±3.2 and 26.57 ±3.64 respectively (Table 8), in addition, based on BMI descriptive classification criteria, body mass status was determined (Table 9).

Table 1. BMI standard measurement

	BMI range	Groups
1	**Less than 16**	Severe thinness
2	**Between 16–17**	Moderate thinness
3	**Between 17-18**	Mild thinness
4	**Between 18–20**	Weight loss
5	**Between 20-25**	Normal
6	**Between 25–29.9**	Mild obesity
7	**Between 30–39.9**	Moderate obesity
8	**More than 40**	Severe obesity

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Table 2. The age status of Qazvin natives in total and by sex separation

The Sample Population / Criteria Per Year	The Total Sample	Male	Female
The mean age±SD	34.01±11.83	34.65±11.94	33.05±11.76
The minimum age	18	18	18
The maximum age	55	55	55

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Table 3. Male weight, standing and sitting height status in Qazvin natives and other studies

Variant / Studies with References	Weight (kg)				Standing Height (cm)				Sitting Height (cm)			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Present study	72.64	11.03	55	100	171.41	5.33	151	182.4	90.22	4.04	81.8	97.8
Hausas of northern Nigeria (1)	62.09	10.69	-		169	8.2	-		-	-	-	
Taiwanese (4)	67.5	-	-		169.9	-	-		90.7	-	-	
Chinese (4)	59	-	-		167.8	-	-		90.8	-	-	
Japanese (4)	65.5	-	-		169	-	-		90.9	-	-	
Korean (4)	66	-	-		170.7	-	-		92.1	-	-	
Iranian University Students (5)	70.14	12.44	-		174.18	6.3	-		89.7	3.53	-	
South Eastern Nigeria Agricultural Workers (15)	56.7	7.14	-		163.4	5.84	-		83.7	2.64	-	
Filipino manufacturing workers (17)	-	-	-		167	8.03	-		84.8	5.81	-	
South Western Nigeria (18)	-	-	-		174.8	9.7	-		84.9	4.9	-	
Australian New South Wales University students (19)	-	-	-		175.7	7.2	-		92.5	4.9	-	

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Table 4. Male weight, standing and sitting height status in Qazvin natives and other studies

Variant / Studies with References	Weight (kg)				Standing Height (cm)				Sitting Height (cm)			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Present study	66.53	9.48	43	85.7	158.24	5.2	151	182.4	86.24	2.45	77.5	89.7
Hausas of northern Nigeria (1)	59.07	12.29	-		160	6.8	-		-	-	-	
Taiwanese (4)	53.8	-	-		157.3	-	-		84.8	-	-	
Chinese (4)	52	-	-		157	-	-		85.5	-	-	
Japanese (4)	52.2	-	-		156.9	-	-		85	-	-	
Korean (4)	53.5	-	-		158.8	-	-		86.6	-	-	
Iranian University Students (5)	58.1	8.63	-		159.49	5.9	-		83.95	3.77	-	
South Eastern Nigeria Agricultural Workers (15)	51.3	4.91	-		156.8	5.28	-		74.8	2.4	-	
Japanese (16)	49.5	4.2	-		159.9	5.9	-		-	-	-	
Thailand (16)	51.2	5.9	-		160.6	6.0	-		-	-	-	
Filipino manufacturing workers (17)	-	-	-		153.9	8.28	-		79.9	4.5	-	
Australian New South Wales University students (19)	-	-	-		163.2	6	-		86.5	3.3	-	

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Table 5. The age status of Qazvin natives in total and by sex separation

Gender / Standing Height (mm)	Male (m)		Female (f)	
	Number	%	Number	%
Very short (m<1499) & (f<1399)	0	0	0	0
Short (m=1500-1599) & (f = 1400 – 1489)	3	1.7	12	10
Average (m = 1600 – 1699) & (f = 1490 – 1589)	63	35	45	37.5
Tall (m = 1700 – 1799) & (f = 1590 – 1679)	102	56.7	63	52.5
Very tall (m>1800) & (f>1680)	12	6.6	0	0

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Table 6. Cormic index assessment in Qazvin natives and other studies by sex segregation

Variant / Studies with References	Male			Female		
	Mean±SD	Min	Max	Mean±SD	Min	Max
Present study	52.51±2.07	45.83	57.94	54.52±1.57	50.32	58.1
Brazilian (7)	-	-	52.8	-	10	-
South Eastern Nigeria Agricultural Workers (15)	51.22	-	-	-	37.5	-
Tribal workers of Northeast Indian (20)	52.54	-	-	-	52.5	-

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Table 7. frequency distribution of cormic index descriptive groups in Qazvin natives

Sex / Trunk, Extremity Ratio	Male		Female	
	Number	%	Number	%
Brachy cormic	33	18.3	3	2.5
Methro cormic	66	36.7	6	5
Macro cormic	81	45	111	92.5

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Table 8. BMI analysis in Qazvin natives and other studies by sex segregation

Variant / Studies with References	Male			Female		
	Mean±SD	Min	Max	Mean±SD	Min	Max
Present study	24.67±3.2	19.95	33.68	26.57±3.64	18.36	32.84
Hausas of northern Nigeria (1)	21.77±3.39	-		23.06± 4.75	-	
Adult male in Northeast India (8)	19.14±2.06	-		-	-	
Thailand (16)	-	-		19.8 ± 2.0	-	
Japanese (16)	-	-		19.4 ± 1.5	-	

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Table 9. frequency distribution of BMI descriptive groups in Qazvin natives by sex segregation

Gender / BMI description	Male		Female	
	Number	%	Number	%
Very thin	0	0	0	0
Thin	3	1.7	6	5
Normal	132	73.3	57	47.5
Overweight	33	18.3	33	27.5
Obese	12	6.7	24	20

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4. Discussion

The results of the present study show that the mean age of males from Qazvin was higher than females (Table 2). According to the data in Table 3 and 4, the mean weight obtained for men and women was higher than the others (1, 4, 5, 15, 16). The mean standing height of men was higher than 6 countries: Nigerian (1, 15), Filipino (17), Taiwanese, Chinese, Japanese, Korean (4), but lower than the others (5, 18, 19) and the mean standing height of women was higher than 5 countries: Nigerian (15), Filipino (17), Taiwanese, Chinese, Japanese (4), but lower than the others (1, 4, 5, 16, 19). The data demonstrated that the mean sitting height for males was higher than Iranian students (5), Nigerian (15, 18), Filipino (17), but lower than the others (4, 19). The mean sitting height of women was lower than Korean and Australian (4, 19) and higher than the others (4, 5, 15, 17). As shown in Table 5, the majority of both genders in Qazvin residents were tall. The mean cormic index was as same as Indian (20) and higher than Nigerian (15) for men, but it was higher in women compared with Brazilaian (7) (Table 6). The data based on cormic index classification demonstrated macro cormic in both under study sexes (Table 7). The results of this study showed that the mean BMI for females and males was higher than the other studies (1, 8, 16) (Tables 8) and also revealed that the high proportions of both genders from Qazvin had normal weight (Table 9). The results of the present study represented the higher mean dimension of weight and BMI (both

genders) as well as higher sitting height (females) than the others. The final purpose of the present study could be achieving high quality of well-being, in designing fit equipment and in selection of specific exercise for each person.

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References

1. Taura M.G. Evaluation of anthropometric status of Hausas of northern Nigeria. BAJOPAS. 2011; 4(2): 80 – 82.

2. Dezenberg CV, Nagy TR, Gower BA, JohnsonR, and Goran MI. Predicting body composition from anthropometry in pre-adolescent children. INT J OBESITY. 1999; 23: 253-259.

3. Moreno LA, Rodrı´guez G, Guille´n J, Rabanaque MJ, Leo´n JF and Arin˜o A. Anthropometric measurements in both sides of the body in the assessment of nutritional status in prepubertal children. EJCN. 2002; 56: 1208–1215.

4. Lin YC, Wang MJ, Wang EM. The comparisons of anthropometric characteristics among four peoples in East Asia. APPL ERGON. 2004; 35: 173–178.

5. Mirmohammadi SJ, Mehrparvar AH, Jafari S, and Mostaghaci M. An Assessment of the Anthropometric Data of Iranian University Students. IJOH. 2011; 3: 85-89.

6. Hassanzadeh Gh, Sadr M, Alaghbandha N, Dehbashipour A, Abrar Abbas M, Heydar Zeidi O. Anthropometric Characteristics of Craniums in Residents of Qazvin, Iran and Dera Ghazi Khan, Pakistan: A Comparative Study. Anat Sci J. 2013; 10 (1): 43-49.

7. Velásquez-Meléndez G, Silveira EA, Allencastro-Souza P, Kac G. Relationship Between Sitting-Height-to-Height Ratio and Adiposity in Brazilian Women. Am J Hum Biol. 2005; 17 (5): 646–653.

8. Khongsdier R. Body mass index of adult males in 12 populations of Northeast India. ANN HUM BIOL. 2001; 28 (4): 374-383.

9. Parker DR, Lapane KL, Lasater TM, Carleton RA. Short height and cardiovascular disease among men and women from two southeastern New England communities. Int J Epidemiol. 1998; 27: 970–975.

10. Goldbourt U and Tanne D. Body height is associated with decreased long-term stroke but not coronary heart disease mortality? Stroke. 2002; 33: 743–748.

11. Song YM, Smith GD, Sung J. Adult height and cause-specific mortality: a large prospective study of South Korean men. Am J Epidemiol. 2003; 158: 479–485.

12. Sichieri R, Siqueira KS, Moura AS. Obesity and abdominal fatness associated with undernutrition early in life in a survey in Rio de Janeiro. Int J Obes Relat Metab Disord. 2000; 24: 614–661.

13. Sichieri R, Silva CV, Moura AS. Combined effect of short height and socioeconomic status on body mass index and weight gain during reproductive age in Brazilian women. Braz J Med Biol Res. 2003; 36: 1319–1325.

14. Wan Nudri WD, Ismail MN, and Zawiak H. Anthropometric measurements and body composition of selected national athletes. Mal J Nutr. 1996; 2: 138-147.

15. Onuoha SN, Idike FI, Oduma O. Anthropometry of South Eastern Nigeria Agricultural Workers. IJET. 2012; 2 (6).

16. Morinaka T, Limtrakul P, Makonkawkeyoon L and Sone Y. Comparison of variations between percentage of body fat, body mass index and daily physical activity among young Japanese and Thai female students. J Physiol Anthropol. 2012; 31:21.

17. Del Prado-Lu JL. Anthropometric measurement of Filipino manufacturing workers. INT J IND ERGONOM. 2007; 37: 497–503.

18. Ismaila SO, Akanbi DG, Adunkle NO, Adetunji OR and Kuye SI. An Ergonomics Assessment of Passengers seats in South Western Nigeria. SIGURNOST. 2010; 52(4): 329-334.

19. Ward S. Anthropometric data and Australian populations –do they fit? HFESA 47th Annual Conference. Ergonomics Australia - Special Edition. 2011.

20. Agrawal K.N, Singh R.K.P and Satapathy K.K. Anthropometric considerations of farm tools/machinery design for tribal workers of northern Indian. Agric Eng Int: CIGR Journal. 2010; 12(1):143- 150.