



GROWTH-AND-OBESITY CALCULATIONS OF S. FAMILY

SGPP-KHI-20110614-01



Table 1. Parents' Fractional Ages, Heights and Weights

<i>Date Format</i> <i>Year-Month-Day</i>	<i>Father</i> <i>(valid if A > 21 years)</i>	<i>Mother</i> <i>(valid if A > 19 years)</i>
Date of Birth (YYYY-MM-DD)	1974-08-08	1980-02-15
Decimal Date of Birth	1974.60273972602	1980.1256830601
Date of Checkup (YYYY-MM-DD)	2012-07-15	2012-07-15
Decimal Date of Checkup	2012.53825136612	2012.53825136612
Age (YY-MM-DD)	37-11-07	32-05-00
Decimal Age, A (years)	37.9355116401	32.41256830602
Height, <i>h</i> (cm)	172.01	162.94
Height (ft-in) [§]	5 ft 7.7204724409 in	5 ft 4.1496062992 in
Gross Mass (kg)	76.38	61.63
Dress Code (Undressing) [¶]	2/2 (2/2) [#]	3/3 (2/2) [@]
Clothing Correction (kg)	0.30	0.30
Net Mass, μ (kg)	76.08	61.33
Net Weight, <i>W</i> (lb-oz) = 2.205μ [‡]	167 lb 12.1024 oz	135 lb 3.7224 oz
Body-Mass Index, BMI (kg/m ²)	25.7136135275	23.1002957817

[§] h (in) = $\frac{h(cm)}{2.54}$; 1 ft = 12 in; ft stands for feet and in for inch(es)

[¶]For explanation of dress code (undressing), see *Manual for Obtaining Anthropometric Measurements*, available at: https://www.ngds-ku.org/ngds_folder/M02.pdf

[#]T-shirt, trousers

[@]For the purpose of height measurement and weighing *abaya* (an outer garment worn by Muslim women), *headscarf* and *veil* were removed and she was checked in dress code 2/2.

[‡]1 kg = 2.205 lb; 1 lb = 16 oz

Table 2. Height Percentiles, Optimal Masses and Mass Percentiles (Parents)²

	<i>Father</i> (valid if A > 21 years)	<i>Mother</i> (valid if A > 19 years)
$h_{<} (cm)$	172.00	159.00
$h (cm)$	172.01	162.94
$h_{>} (cm)$	176.50	163.50
$P(h)_{<}$	25	25
$P(h)$	25.0555555555	46.8888888887
$P(h)_{>}$	50	50
$\mu_{opt<} (kg)$	63.25	52.25
$\mu_{opt} (kg)$	63.266111111	57.5033333333
$W_{opt} (lb-oz)$	139 lb 8.028399984 oz	126 lb 12.717599984 oz
$\mu_{opt>} (kg)$	70.50	58.25
$\mu_{<} (kg)$	70.50	58.25
$\mu (kg)$	76.08	61.33
$\mu_{>} (kg)$	79.00	66.00
$P(\mu)_{<}$	50	50
$P(\mu)$	66.4117647057	59.9354838707
$P(\mu)_{>}$	75	75

²Growth parameters (height, mass, percentiles) have been taken from Growth Tables generated from Growth Charts. These tables appear in: Kamal SA and Jamil SS, A Method to Generate Growth-and-Obesity Profiles of Still-Growing Parents, *International Journal of Biology and Biotechnology* 9 (3): 233-255, 2012, available at: <https://www.ngds-ku.org/Papers/J30.pdf>

Table 3. Obesity Profiles (Parents)

	<i>Father</i> (valid if A > 21 years)	<i>Mother</i> (valid if A > 19 years)
$\Delta\mu$ (kg) = $\mu - \mu_{opt}$	+12.813888889	+3.8266666667
ΔW (lb-oz) = 2.205 $\Delta\mu$	+28 lb 4.0740000032 oz	+8 lb 7.00480000112 oz
$100 \frac{ \Delta\mu }{\mu_{opt}} \%^{\text{©}}$	20.253953758%	6.65468668489%*
STATUS[©]	OBESE	OBESE

Table 4. Adult-Mid-Parental (Target) Heights and Percentiles

<i>Adult-MP-Height Formula</i>	<i>Boy</i> = $\frac{M + F + 13}{2}$	<i>Girl</i> = $\frac{M + F - 13}{2}$
$h_{adult-MP<} (cm)$	172.00	159.00
$h_{adult-MP}(cm)$	173.975	160.975
$h_{adult-MP}(ft-in)$	5 ft 8.4940944881 in	5 ft 3.3759842519 in
$h_{adult-MP>} (cm)$	176.50	163.50
$P_{MP<}$	25	25
P_{MP}	35.972222222	35.972222222
$P_{MP>}$	50	50

*Valid if the mother is **NOT PREGNANT**. In case of pregnancy, add estimated weight of fetus and re-determine difference of mass (weight)-for-height and status.

©Pertaining-to-mass (weight)

$$STATUS = 100 \frac{|\mu - \mu_{opt}|}{\mu_{opt}} = 100 \frac{|\Delta\mu|}{\mu_{opt}} = 100 \frac{|W - W_{opt}|}{W_{opt}}$$

COLOR CODES FOR STAUSES		<1%	Hue 085, Sat 255, Lum 064	Red 000, Green 128, Blue 000
		1-10%	Hue 042, Sat 255, Lum 128	Red 255, Green 255, Blue 000
		>10%	Hue 000, Sat 255, Lum 092	Red 184, Green 000, Blue 000

Table 5. Pakistan Army-Cutoff-Adult Heights and Percentiles

<i>Army-Cutoff-Adult Height</i>	<i>Males = 5 ft 4 in</i>	<i>Females = 5 ft 2 in</i>
$h_{\text{cutoff,adult} <} (cm)$	—	154.75
$h_{\text{cutoff,adult}} (cm)$	162.56	157.48
$h_{\text{cutoff,adult} >} (cm)$	163.00	159.00
$P_{\text{cutoff} <}$	—	10
P_{cutoff}	<3**	19.6352941175
$P_{\text{cutoff} >}$	3	25

Extrapolating, using heights corresponding to 3rd (163.00 cm) and 5th (165.00 cm) percentiles, the percentile for males' army-cut-off height comes out to **2.56

Table 6. Fractional Ages, Heights and Weights (Children)

<i>Date Format</i> <i>Year-Month-Day</i>	<i>Jt. U.</i>	<i>Jm. U.</i>
Gender	Female	Female
Date of Birth	2005-04-10	2006-03-23
Decimal Date of Birth	2005.27397260273	2006.22465753424
Date of Checkup	2012-07-15	2012-07-15
Decimal Date of Checkup	2012.53825136612	2012.53825136612
Age	07-03-05	06-03-22
Decimal Age, <i>A</i> (<i>years</i>)	7.26427876339	6.31359383188
Height, <i>h</i> (<i>cm</i>)	119.36	119.15
Height (<i>ft-in</i>)	3 <i>ft</i> 10.9921259842 <i>in</i>	3 <i>ft</i> 10.9094488188 <i>in</i>
Gross Mass (<i>kg</i>)	19.19	19.14
Dress Code (Undressing) [¶]	1.5/1.5 (0/0.5) [§]	2.5/2 (0/2) [®]
Clothing Correction (<i>kg</i>)	0	0.10
Net Mass, μ (<i>kg</i>)	19.19	19.04
Net Weight, W (<i>lb-oz</i>) = 2.205 μ [‡]	42 <i>lb</i> 5.0232 <i>oz</i>	41 <i>lb</i> 15.7312 <i>oz</i>
Body-Mass Index, <i>BMI</i> (<i>kg/m</i> ²)	13.4696823631	13.411546213

[¶]See relevant note on page 1

[§]Sleeveless dress (*Undressing*: to panties only, barefoot, all clothing above the waist removed; *Clothing Correction* was taken as zero as the child was weighed in near-nude state)

[®]*Shalwar/kameez* with *dupatta* (*Undressing*: to waist, barefoot, wearing trousers)

[‡]See relevant note on page 1

Table 7. Height and Mass Percentiles (Hr. S.: Female)

$$h = 119.36 \text{ cm}$$

<i>Percentile</i>	25	50	
<i>Age (years)</i>			
$A_{<} = 7.0$	117.50	121.50	
$A = 7.26427876339$	119.349951343	119.36	123.08567258
$A_{>} = 7.5$	121.00	124.50	

$$P(h) = 25.0672471012$$

$$\mu = 19.19 \text{ kg}$$

<i>Percentile</i>	05	10	
<i>Age (years)</i>			
$A_{<} = 7.0$	18.25	19.00	
$A = 7.26427876339$	18.646418145	19.19	19.5285575267
$A_{>} = 7.5$	19.00	20.00	

$$P(\mu) = 8.08104289565$$

Table 8. Optimal Mass and Estimated-Adult Height (Hr. S.: Female)

<i>Height Percentile</i>	25	25.0672471012	50
$\mu_{\text{opt}<}(kg)$ [$A_{<} = 9.0$ years]	20.50	20.505379768	22.50
$\mu_{\text{opt}}(kg)$ [$A = 9.1698630137$ years]	21.0285575267 [¥]	21.034648174 21.034648174 [¥]	23.2928362901 [¥]
$W_{\text{opt}}(lb-oz)$	21.50	21.5067247101	24.00
$\mu_{\text{opt}>}(kg)$ [$A_{>} = 9.5$ years]		46 lb 6.1023875776 oz	
$h_{\text{est-adult}}(cm)$	159.00	159.012104478	163.50
$h_{\text{est-adult}}(ft-in)$		5 ft 2.6031907393 in	
$\Delta\mu(kg) = \mu - \mu_{\text{opt}}$		-1.844648174	
$\Delta W(lb-oz) = 2.205\Delta\mu$		-4 lb 1.07918757872 oz	
$100 \frac{ \Delta\mu }{\mu_{\text{opt}}} \%^{\text{©}}$		8.76956989601%	
<i>STATUS</i> [©]		WASTED	

Table 9. Estimated-Adult Mass and Weight (Jt. U.: Female)

<i>Mass Percentile</i>	05	8.08104289565	10
$\mu_{\text{est-adult}}(kg)$	46.50	47.5783650134	48.25
$W_{\text{est-adult}}(lb-oz) =$ $2.205\mu_{\text{est-adult}}$		104 lb 14.564717664 oz	
Estimated-Adult <i>BMI</i> , $BMI_{\text{est-adult}}(kg/m^2)$		18.8169461942	

of constant-age route, which could, also, be used to compute μ_{opt} as 25.10920623004 kg, with identical result 25.10920623004 kg as obtained from constant-percentile route (maroon font).

[©] See relevant note on page 3

Table 10. Computations of Mid-Parental Height at the Current Age (Hr. S.: Female)

<i>MP-Height Percentile</i>	25	35.972222222	50
$h_{MP<}(cm)$ [$A_{<} = 7.0$ years]	117.50	119.255555555	121.50
$h_{MP}(cm)$ [$A = 7.26427876339$ years]	119.349951343 [¥]	120.989517886 120.989517885 [¥]	123.08567258 [¥]
$h_{MP>}(cm)$ [$A_{>} = 7.5$ years]	121.00	122.536111111	124.50
$\Delta h (cm) = h - h_{MP}$		-1.629517886	
$\Delta h (in) = \frac{\Delta h(cm)}{2.54}$		-0.6415424748	
$100 \frac{ \Delta h }{h_{MP}} \%^{\text{³}}$		1.34682567091%	
<i>STATUS</i> ^³		STUNTED	

Table 11. Computations of Army-Cutoff Height at the Current Age (Jt. U.: Female)

<i>Cutoff-Height Percentile</i>	10	19.6352941175 [£]	25
$h_{cutoff<}(cm)$ [$A_{<} = 7.0$ years]	114.50	116.42705882351	117.50
$h_{cutoff}(cm)$ [$A = 7.26427876339$ years]	116.08567258034 [¥]	118.18249164479 118.18249164421 [¥]	119.34995134373 [¥]
$h_{cutoff>}(cm)$ [$A_{>} = 7.5$ years]	117.50	119.74823529409	121.00
$\Delta h_{cutoff}(cm) = h - h_{cutoff}$		+1.177508356	
$h_{cutoff}(in) = \frac{\Delta h_{cutoff}(cm)}{2.54}$		+0.46358596692	

[¥]See relevant note on page 7

$$\text{³Pertaining-to-height: } STATUS = 100 \frac{|h - h_{MP}|}{h_{MP}} = 100 \frac{|\Delta h|}{h_{MP}}$$

[£]The factor $\frac{P_{cutoff} - P_{cutoff <}}{P_{cutoff >} - P_{cutoff <}}$, which is, numerically, equal to 0.64235294117, is constant for all Pakistani females (for males, this factor comes out to -0.22), and need not be recomputed in future

Table 12. Height and Mass Percentiles (Hk. S.: Female)

$$h = 119.15 \text{ cm}$$

<i>Percentile</i>			
<i>Age (years)</i>	50	75	
$A_{<} = 6.0$	114.50	118.00	
$A = 6.31359383188$	116.381562991	119.15	120.195156823
$A_{>} = 6.5$	117.50	121.50	

$$P(h) = 68.1484783837$$

$$\mu = 19.04 \text{ kg}$$

<i>Percentile</i>			
<i>Age (years)</i>	10	25	
$A_{<} = 6.0$	17.00	18.50	
$A = 6.31359383188$	17.7839845797	19.04	19.1271876637
$A_{>} = 6.5$	18.25	19.50	

$$P(\mu) = 24.0263460743$$

Table 13. Optimal Mass and Estimated-Adult Height (Hk. S.: Female)

<i>Height Percentile</i>	50	68.1484783837	75
$\mu_{\text{opt}<}(kg) [A_{<} = 6.0 \text{ years}]$	20.00	21.8148478383	22.50
$\mu_{\text{opt}}(kg) [A = 6.31359383188 \text{ years}]$	20.9407814956 [¥]	22.75562933394 22.75562933395 [¥]	23.4407814956 [¥]
$W_{\text{opt}}(lb-oz)$	21.50	23.3148478383	24.00
$\mu_{\text{opt}>}(kg) [A_{>} = 6.5 \text{ years}]$		50 lb 2.8186028992 oz	
$h_{\text{est-adult}}(cm)$	163.50	166.40375654136	167.50
$h_{\text{est-adult}}(ft-in)$		5 ft 5.5132899767 in	
$\Delta\mu(kg) = \mu - \mu_{\text{opt}}$		-3.71562933394	
$\Delta W(lb-oz) = 2.205\Delta\mu$		-8 lb 3.08740290128 oz	
$100 \frac{ \Delta\mu }{\mu_{\text{opt}}} \%^{\text{©}}$		16.3283962812%	
<i>STATUS</i> [©]		WASTED	

Table 14. Estimated-Adult Mass and Weight (Hk. S.: Female)

<i>Mass Percentile</i>	10	24.0263460743	25
$\mu_{\text{est-adult}}(kg)$	48.25	51.9903589531	52.25
$W_{\text{est-adult}}(lb-oz) = 2.205\mu_{\text{est-adult}}$		114 lb 10.219863856 oz	
Estimated-Adult <i>BMI</i> , $BMI_{\text{est-adult}}(kg/m^2)$		18.7757184198	

[¥]See relevant note on page 7

[©]See relevant note on page 3

Table 15. Mid-Parental Height at the Current Age (Hk. S.: Female)

<i>MP-Height Percentile</i>	25	35.972222222	50
$h_{MP<}(cm)$ [$A_{<} = 6.0$ years]	110.50	112.25555555552	114.50
$h_{MP}(cm)$ [$A = 6.31359383188$ years]	113.00875065504 [¥]	114.48904051369 114.48904051369 [¥]	116.38156299128 [¥]
$h_{MP>}(cm)$ [$A_{>} = 6.5$ years]	114.50	115.81666666664	117.50
$\Delta h (cm) = h - h_{MP}$		+4.66095948631	
$\Delta h (in) = \frac{\Delta h(cm)}{2.54}$		+1.8350234198	
$100 \frac{ \Delta h }{h_{MP}} \% ^{\textcircled{3}}$		4.07109664417%	
<i>STATUS</i> ³		TALL	

[¥]See relevant note on page 7

³See relevant note on page 8

Table 16. Computations of Army-Cutoff Height at the Current Age (Hk. S.: Female)

<i>Cutoff-Height Percentile</i>	10	19.6352941175 [£]	25
$h_{\text{cutoff} <} (cm)$ [$A_{<} = 6.0 \text{ years}$]	108.00	109.60588235292	110.50
$h_{\text{cutoff}} (cm)$ [$A = 6.31359383188 \text{ years}$]	110.19515682316 [¥]	112.00247709632 112.00247709632 [¥]	113.00875065504 [¥]
$h_{\text{cutoff} >} (cm)$ [$A_{>} = 6.5 \text{ years}$]	111.50	113.42705882351	114.50
$\Delta h_{\text{cutoff}} (cm) = h - h_{\text{cutoff}}$		+7.14752290368	
$h_{\text{cutoff}} (in) = \frac{\Delta h_{\text{cutoff}} (cm)}{2.54}$		+2.81398539514	

[£]See relevant note on page 9

Associated Report: Growth-and-Obesity Profiles of U. Family
https://www.ngds-ku.org/Profiles/Growth_n_Obesity_Profile.pdf

Web address of this document: Growth-and-Obesity Calculations of U. Family
https://www.ngds-ku.org/Profiles/Growth_n_Obesity_Calculations.pdf