ACUTE MALNUTRITION IN A CHILD SUFFERING FROM CARIAC PROBLEMS

http://www.ngds-ku.org/Papers/J40.pdf

COLOR-CODING KEYS

Syed Arif Kamal[¶]

Additional File

Table of Contents

m: *meter* • *cm*: *centimeter* • *ft*: *foot* • *in*: *inch* • *kg*: *kilogram* • *lb*: *pound* • *oz*: *ounce*
1 *m* = 100 *cm* • 1 *in* = 2.54 *cm* • 1 *ft* = 12 *in* • 1 *kg* = 2.205 *lb* • 1 *lb* = 16 *oz*

[#]Professor of Mathematics and Dean, Faculty of Science, University of Karachi, Karachi 75270, Pakistan; *homepage*: http://www.ngds-ku.org/kamal; *e-mail*: profdrakamal@gmail.com

COPYRIGHT 2015. THE NGDS PILOT PROJECT (http://ngds-ku.org) and THE ANTHROMATHEMATICS GROUP of DEPARTMENT OF MATHEMATICS, UNIVERSITY OF KARACHI

Formulae used to Generate Growth-and-Obesity Roadmaps I

1. Age was computed by, first converting dates from format *YYYY-MM-DD* into fractional forms, using the following formulae and Table 4 (page 94) of (http://www.ngds-ku.org/Papers/J29.pdf) and, then, writing in decimal forms:

$$Date\ (year)\ = YYYY + \frac{Days(MM-1)+DD}{365};\ Age\ (year) = Date\ of\ Checkup - Date\ of\ Birth$$

$Days(MM-1)$ represented cumulative days of the previous month. For a leap year, replace 365 by 366.

2. Percentile of height of an adult was calculated by linear interpolation using:

$$P(h) = P(h_<) + \left(P(h_>) - P(h_<)\right)\left(\frac{h-h_<}{h_> - h_<}\right)$$

where $P(h_<)$, $P(h)$, $P(h_>)$ represented percentiles corresponding to heights, $h_<$ (20-year height read from extended growth table (http://www.ngds-ku.org/Papers/J34/Additional_File_3.pdf) which was below the measured height), h , $h_>$ (20-year height read from growth table, which was above the measured height).

3. Percentile of mass of an adult was calculated with the help of the following formula:

$$P(\mu) = P(\mu_<) + \left(P(\mu_>) - P(\mu_<)\right)\left(\frac{\mu-\mu_<}{\mu_> - \mu_<}\right)$$

where $P(\mu)$ represented percentile of height and $P(\mu_<)$ and $P(\mu_>)$ were the values used for linear interpolation.

4. Estimated-adult height and estimated-adult mass were calculated using the relations:

$$h_{\text{est–adult}} = h_{\text{age–20<}} + \left(h_{\text{age–20>}} - h_{\text{age–20<}}\right)\left(\frac{P(h)-P(h_<)}{P(h_>)-P(h_<)}\right)$$

$$\mu_{\text{est–adult}} = \mu_{\text{age–20<}} + \left(\mu_{\text{age–20>}} - \mu_{\text{age–20<}}\right)\left(\frac{P(\mu)-P(\mu_<)}{P(\mu_>)-P(\mu_<)}\right)$$

COPYRIGHT 2015. THE NGDS PILOT PROJECT (http://ngds-ku.org) and THE ANTHROMATHEMATICS GROUP of DEPARTMENT OF MATHEMATICS, UNIVERSITY OF KARACHI

Formulae used to Generate Growth-and-Obesity Roadmaps II

5. *BMI* (body-mass index) and estimated-adult *BMI* were computed using (heights in *m* and masses in *kg*)**:**

$$BMI = \frac{\mu}{h^2};\ BMI_{\text{est–adult}} = \frac{\mu_{\text{est–adult}}}{(h_{\text{est–adult}})^2}$$

6. Optimal mass of an adult was calculated from the expression**:**

$$\mu_{\text{opt}} = \mu_< + (\mu_> - \mu_<)\left(\frac{P(h) - P(h_<)}{P(h_>) - P(h_<)}\right),\ 20\ years \le A < 30\ years;\ \mu_{\text{opt}} = 24h^2,\ A \ge 30\ years$$ (height, h in m)

where A denotes age in years, $P(h)$ represent percentile of height and $P(h_<)$ and $P(h_>)$ were the values used for linear interpolation. For mothers, currently married or recently divorced/widowed, 5 *kg* was added to optimal mass (computed from the above formulae) to account for possible pregnancy and the associated fetal mass.

7. Adult-mid-parental (Target) heights of boy, $h_{\text{MP–BOY}}$, and girl, $h_{\text{MP–GIRL}}$, were given by**:**

$$h_{\text{MP–BOY}} = \frac{F + M + 13}{2};\ h_{\text{MP–GIRL}} = \frac{F + M - 13}{2}$$

F and M represented heights of father and mother, respectively. All heights were in *cm*.

8. Algebraic status, pertaining-to-height, (h was height of the individual and $h_{\text{current–age–MP}}$ was the current-age-mid-parental height) as well as **a**lgebraic status, pertaining-to-mass, were computed using the formulae**:**

$$STATUS_{\pm}(h) = 100\frac{h - h_{\text{current-age-MP}}}{h_{\text{current-age-MP}}}\%;\ STATUS_{\pm}(\mu) = 100\frac{\mu - \mu_{\text{opt}}}{\mu_{\text{opt}}}\%$$

9. To determine percentile of reference height, P_{ref}, select the larger value from 3 values consisting of percentile of current height, $P(h)$, percentile of gender-specific-army-cutoff-height percentile, $P_{\text{army–cutoff}}$, as well as percentile of gender-specific-MP-height percentile, P_{MP}, where parents' heights were available; otherwise choose larger of $P(h)$ and $P_{\text{army–cutoff}}$ **:**

$P_{\text{ref}} = \max(P(h), P_{\text{army–cutoff}}, P_{\text{MP}})$, parents' heights available; $P_{\text{ref}} = \max(P(h), P_{\text{army–cutoff}})$, otherwise

COPYRIGHT 2015. THE NGDS PILOT PROJECT http://ngds-ku.org) and THE ANTHROMATHEMATICS GROUP of DEPARTMENT OF MATHEMATICS, UNIVERSITY OF KARACHI

Color Coding for Classification of Qualitative Status (pertaining-to-height)

4th-Degree Stunted	Hue Sat Lum	000 255 255 000 128 000	Red Green Blue	$STATUS_{\pm}(h) < -30$
3rd-Degree Stunted	Hue Sat Lum	019 227 233 108 119 010	Red Green Blue	$-30\% \leq STATUS_{\pm}(h) < -20\%$
2nd-Degree Stunted	Hue Sat Lum	032 255 255 192 128 000	Red Green Blue	$-20\% \leq STATUS_{\pm}(h) < -10\%$
1st-Degree Stunted	Hue Sat Lum	042 255 255 255 128 000	Red Green Blue	$-10\% \leq STATUS_{\pm}(h) < -1\%$
Normal	Hue Sat Lum	104 000 255 176 088 080	Red Green Blue	$-1\% \leq STATUS_{\pm}(h) < +1\%$
1st-Degree Tall	Hue Sat Lum	042 255 255 255 128 000	Red Green Blue	$+1\% \leq STATUS_{\pm}(h) < +10\%$
2nd-Degree Tall	Hue Sat Lum	032 255 255 192 128 000	Red Green Blue	$+10\% \leq STATUS_{\pm}(h) < +20\%$
3rd-Degree Tall	Hue Sat Lum	019 227 233 108 119 010	Red Green Blue	$+20\% \leq STATUS_{\pm}(h) < +30\%$
4th-Degree Tall	Hue Sat Lum	000 255 255 000 128 000	Red Green Blue	$STATUS_{\pm}(h) \geq +30\%$

Month-wise recommendations to gain height (*cm/month*)
Hue 149 • Sat 255 • Lum 204• Red 153 • Green 204 • Blue 255

Row separation in Growth-and-Obesity Roadmaps
Hue 170 • Sat 000 • Lum 230• Red 230 • Green 230 • Blue 230

COPYRIGHT 2015. THE NGDS PILOT PROJECT (http://ngds-ku.org) and THE ANTHROMATHEMATICS GROUP of DEPARTMENT OF MATHEMATICS, UNIVERSITY OF KARACHI

Color Coding for Classification of Qualitative Status (pertaining-to-mass)

4th-Degree Wasted	**Hue Sat Lum**	**000 255 255 000 128 000**	**Red Green Blue**	$STATUS_{\pm}(\mu) < -30$
3rd-Degree Wasted	**Hue Sat Lum**	**019 227 233 108 119 010**	**Red Green Blue**	$-30\% \leq STATUS_{\pm}(\mu) < -20\%$
2nd-Degree Wasted	**Hue Sat Lum**	**032 255 255 192 128 000**	**Red Green Blue**	$-20\% \leq STATUS_{\pm}(\mu) < -10\%$
1st-Degree Wasted	**Hue Sat Lum**	**042 255 255 255 128 000**	**Red Green Blue**	$-10\% \leq STATUS_{\pm}(\mu) < -1\%$
Normal	**Hue Sat Lum**	**104 000 255 176 088 080**	**Red Green Blue**	$-1\% \leq STATUS_{\pm}(\mu) < +1\%$
1st-Degree Obese	**Hue Sat Lum**	**104 000 255 176 088 080**	**Red Green Blue**	$+1\% \leq STATUS_{\pm}(\mu) < +10\%$
2nd-Degree Obese	**Hue Sat Lum**	**032 255 255 192 128 000**	**Red Green Blue**	$+10\% \leq STATUS_{\pm}(\mu) < +20\%$
3rd-Degree Obese	**Hue Sat Lum**	**019 227 233 108 119 010**	**Red Green Blue**	$+20\% \leq STATUS_{\pm}(\mu) < +30\%$
4th-Degree Obese	**Hue Sat Lum**	**000 255 255 000 128 000**	**Red Green Blue**	$STATUS_{\pm}(\mu) \geq +30\%$

Month-wise recommendations to gain mass (*kg/month*)

Hue 149 • Sat 255 • Lum 204• Red 153 • Green 204 • Blue 255

COPYRIGHT 2015. THE NGDS PILOT PROJECT http://ngds-ku.org) and THE ANTHROMATHEMATICS GROUP of DEPARTMENT OF MATHEMATICS, UNIVERSITY OF KARACHI

Color Coding for Classification of Build

$0 \le P(h) + P(\mu) < 50$	Hue Sat Lum	000 255 255 000 128 000	Red Green Blue	Small
$50 \le P(h) + P(\mu) < 150$	Hue Sat Lum	104 000 255 176 088 080	Red Green Blue	Medium
$150 \le P(h) + P(\mu) < 200$	Hue Sat Lum	042 255 255 255 128 000	Red Green Blue	Big

From left to right, an example of children of different builds — brain-function-dominating small (E. P.: SGPP-KHI-20081031-01/02; age 7 *year* 11 *month*; sum of percentiles 8.08), brain-and-body-function-equally-contributing medium (R. Z. A. Q.: SGPP-KHI-20080423-01/02; age 4 *year* 3 *month* 9 *day*; sum of percentiles 54.29) and body-function-dominating big (R. Z. A.: SGPP-KHI-20080910-01/02; age 3 *year* 4 *month* 11 *day*; sum of percentiles 161.13)

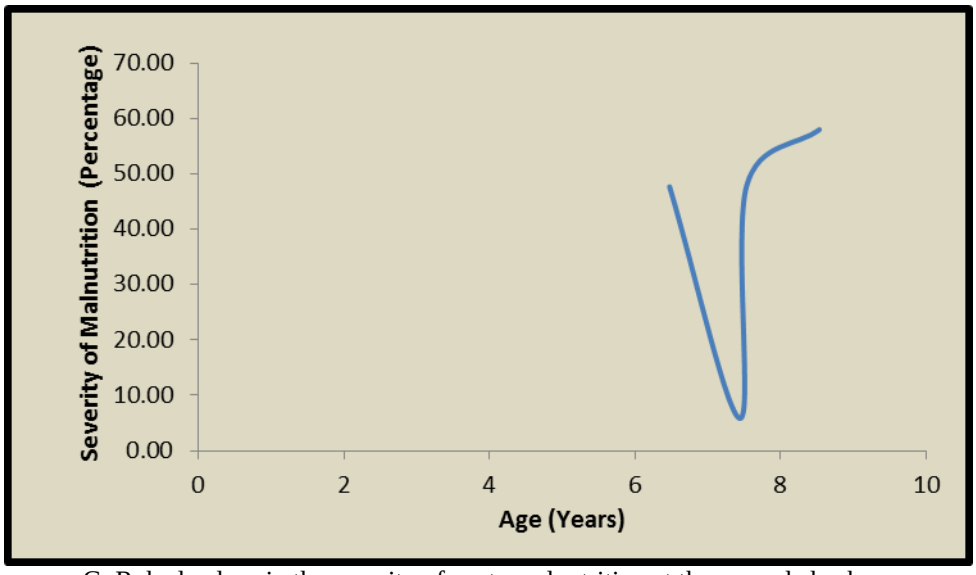
COPYRIGHT 2015. THE NGDS PILOT PROJECT (http://ngds-ku.org) and THE ANTHROMATHEMATICS GROUP of DEPARTMENT OF MATHEMATICS, UNIVERSITY OF KARACHI

Color Coding for Nutritional-Status Classification

Worked examples**:** http://www.ngds-ku.org/Presentations/Sport_Mathematics/Additional_File.pdf

COPYRIGHT 2015. THE NGDS PILOT PROJECT http://ngds-ku.org) and THE ANTHROMATHEMATICS GROUP of DEPARTMENT OF MATHEMATICS, UNIVERSITY OF KARACHI

Severity of Acute Malnutrition



G. R. had a drop in the severity of acute malnutrition at the second checkup. However, the index increased from third to fourth checkup.

COPYRIGHT 2015. THE NGDS PILOT PROJECT (http://ngds-ku.org) and THE ANTHROMATHEMATICS GROUP of DEPARTMENT OF MATHEMATICS, UNIVERSITY OF KARACHI

Auscultation of Heart and Anthropometry

From left to right, auscultation of heart sounds at *PMI*, pulmonary and tricuspid valves as well as measurements of height and mass of a girl

Web address of the main document:
ACUTE MALNUTRITION IN A CHILD SUFFERING FROM CARDIAC PROBLEMS
http://www.ngds-ku.org/Papers/J40.pdf

Web address of this document:
Additional File: COLOR-CODING KEYS
http://www.ngds-ku.org/Papers/J40/Additional_File.pdf

COPYRIGHT 2015. THE NGDS PILOT PROJECT http://ngds-ku.org) and THE ANTHROMATHEMATICS GROUP of DEPARTMENT OF MATHEMATICS, UNIVERSITY OF KARACHI