

\*

12-10 209

PWC170 PWC170

VO2 max PWC170

.(VO2 max PWC 170)

(risk

factors)

(1997 )

%80

5-4

(obesity)

.(piscopo et al. 1981)

10

2007/6/14

.2008/3/27

\*

209 : - ( )

. 12-10

.2007/5/12 - 2007/3/12 : -

. : -

: (1994) Gutin, et.al., - 12 -10

11-7

570  
%58 - %10

11-7

.(Gutin, et al. 1994)

" : -

"

: 137

%30 68

%30 51

MHR

(220 - )

(200 - )

HR

-1

-2

.(Miller, 1993)

" : (1995) Hager, R.L et al -

"

-1

( )

-2

262

209

2007-2006

(209)

LDL

HDL

(2 1)

:  
 .1 (Hager, et al .1995)  
 .2  
 .4 Stop Watch .3  
 .Skin Fold Caliper .4  
 .5  
 4 .6  
 .2 (Step Test) .7  
 Pulsemeter .8 (12-10)  
 ( )  
 .Earlobe .  
 .9  
 .( ) .10  
 .11  
 .12 (12-10)  
**(1)**

	%20-15
	%30-25
	%30

**(2)**

34.92	73=	1
32.53	68=	2
32.53	68=	3
100	209	

:

(20)

:

-1

-2

:

-3

:

-4

-

(1997 ) : ( ) 8:30

( ) -

) 1.21 =

-(

) 0.008

17-2 (

:PWC170 -

:

-1

(Step Test) 12 -10

PWC170 33

:

15-10 -1 -

:

-2

/ 180 -2

-

-3

:

-

12-10

-

-4

3 6 -5

:

-

3

-6

4

( - - - )

-

-7

.(1979 )



...

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5.511± 42.345)                      VO2max                      902.87)                      PWC170  
 .(3.03 ± 24.25 4.522 ± 31.57                      (151.94 ± 1266.35 169.06 ± 1015.32 148.75±  
 ( )                      (4)                      PWC170  
                     (α=0.0001)                      ± 24.54 2.18 ± 29.26)  
 ( )                      (2.36 ± 23.76 2.53  
 (4.66)                      ( )                      ±2783.38                      VO2max  
                     (206.2)                      (258.30 ± 3392.80 287.40 ± 296.05 252.88

**(3)**

<b>3</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>		
0.570	0.635	0.509	10.69	10.81	10.95		
6.285	5.956	4.065	53.54	41.42	30.97		
7.52	7.60	6.21	144.89	140.32	135.041		
2.67	2.17	2.56	37.89	29.54	15.07	%	
6.48	5.26	4.59	98.61	94.79	89.43	/	
3.98	4.70	4.88	144.22	145.35	139.73	/	
3.35	4.27	3.45	184.22	183.73	181.71	/	
4.50	4.46	5.24	142.33	142.26	135.69	/	
4.25	3.81	5.43	134.02	133.11	125.24	/	2
3.11	3.17	4.95	126.7	123.35	115.75	/	3
151.9	169.0	148.7	1266.3	1015.3	902.87	//	PWC170
2.36	2.53	2.18	23.70	24.54	29.26	///	PWC170
258.3	287.4	252.8	3392.8	2966.5	2773.3	/	VO2max
3.03	4.522	5.511	24.25	31.57	42.345	/ /	VO2max

**(4)**

0.0001*	297.42	8972.44 30.16	17944.89 6214.44 24159.34	2 206 208		
0.0001*	1534.64	9441.91 6.152	18883.83 1267.42 20151.25	2 206 208		
0.0001*	50.03	1502.99 30.044	3005.98 6189.14 9195.13	2 206 208		

0.0001*	30.29	626.80 20.69	1253.60 4263.27 5516.88	2 206 208		N1
0.0002*	9.13	125.91 13.78	251.83 2839.88 3091.72	2 206 208		N2
0.0001*	45.64	1053.58 22.68	2071.16 4673.83 6744.99	2 206 208		
0.0001*	79.30	1660.99 20.944	3321.99 4314.56 7636.55	2 206 208		
0.0001*	148.04	2224.95 15.02	4449.90 3095.97 7545.87	2 206 208		
0.0001*	96.18	2360244.95 24539.23	4720589.90 5055081.76 9775671.66	2 206 208		WC <sub>170</sub>
0.0001*	113.25	630.88 5.57	1261.766 1147.58 2409.35	2 206 208		PWC <sub>170</sub>
0.0001*	96.18	6821252.41 70918.38	13642504.83 14609186.29 28251691.12	2 206 208		VO <sub>2max</sub>
0.0001*	288.96	5854.18 20.25	11708.37 4173.97 15881.85	2 206 208		VO <sub>2max</sub>

(5)

<b>3</b>	<b>2</b>	<b>1</b>			
*22.57	10.45		1	30.97	
*12.11			2	41.42	
			3	53.54	
*22.82	14.466		1	15.07	
*8.35			2	29.54	
			3	37.89	

3	2	1			
*9.17	5.35		1	89.43	
*3.82			2	94.76	
			3	98.61	
*4.48	5.61		1	139.73	
1.123			2	145.35	
			3	144.22	
*2.50	2.02		1	181.71	6
0.48			2	183.73	
			3	184.22	
*6.64	6.56		1	135.69	
0.074			2	142.26	
			3	142.33	
*8.78	7.87		1	125.24	
0.91			2	133.11	
			3	134.02	
*10.92	7.600		1	115.75	
*3.32			2	123.35	
			3	126.67	
*358.48	107.45		1	902.87	PWC <sub>170</sub>
*251.03			2	1015.32	
			3	1266.35	
*5.49	4.72		1	29.20	PWC <sub>170</sub>
0.77			2	24.54	
			3	23.70	
*609.41	182.67		1	2783.38	VO <sub>2</sub> <sub>max</sub>
*426.74			2	2966.05	
			3	3392.60	
*18.086	10.773		1	42.34	VO <sub>2</sub> <sub>max</sub>
*7.31			2	31.57	
			3	24.25	

12.11

( $\alpha=0.05$ )

(5)

( $\alpha=0.05$ )

10.45

14.46

22.17

	( / 0.91)		22.82
.( $\alpha=0.05$ )		8.35	
	(5)		.
	( $\alpha=0.05$ )		( $\alpha=0.05$ )
	( / 10.92)		( / 5.35)
		( / 9.77)	
	( / 3.32)		
	(5)		( / 3.82)
	( $\alpha=0.05$ )	( $\alpha=0.05$ )	
( / / PWC170)			
(107.45)		( / 5.61)	
	(251.03)		( / 4.48)
	(5)	( / 1.132)	
PWC170	( $\alpha=0.05$ )		
4.72)			( $\alpha=0.05$ )
	( / / /		
(5.49)			( $\alpha=0.05$ )
(0.77)			( / 2.02)
		( / 2.50)	
(5)	.( $\alpha=0.05$ )	( / 0.48)	
( $\alpha=0.05$ )			.( $\alpha=0.05$ )
	( / /VO2max)	( $\alpha=0.05$ )	
	(182.67)		
(609.41)		5.56)	
			( /
	(426.74)		( / 6.64)
			( / 0.074)
	( $\alpha=0.05$ )		
( / / /VO2max)		(5)	.( $\alpha=0.05$ )
(10.773)		( $\alpha=0.05$ )	
	(18.086)	( / 7.78)	
(7.31)			( / 8.78)

(6)

0.40 **	0.04 -	0.04	
0.13	0.10	0.08 -	
0.28 *	0.05 -	0.21-	
0.14	0.15 -	0.07 -	
0.03	0.00	0.00 -	
0.18	0.05-	0.07	
0.24 *	0.46 **	0.46 **	PWC <sub>170</sub>
0.20 -	0.08	0.19	PWC <sub>170</sub>
0.24 *	0.46 **	0.46 **	VO2 <sub>max</sub>
0.48 - **	0.45 - **	0.43 - **	VO2 <sub>max</sub>

.05 =  $\alpha$  - \*  
 .01 =  $\alpha$  - \*\*  
 .001 =  $\alpha$  - \*\*\*

(0.05 0.01 =  $\alpha$ ) (6)

PWC<sub>170</sub>

0.19) (0.20 - 0.08) 0.40  
 .01 =  $\alpha$  (6)

VO2<sub>max</sub>

0.46 0.46) =  $\alpha$  0.28  
 a) (0.24) .05  
 (0.05 0.01 = (6)

.(0.40- 0.45- 0.43-)

( )

- \*

(4)

PWC<sub>170</sub>

(0.24 - 0.46 - 0.46)

( )

( )

(5)

( )

(Espstein et.al, 1978)

(%60-80) (Lewis and Lewis, 1974)

(24-16)

(Espstein et.al, 1996)

)

(

(Zuti and Colding,

(Hokey, 1985)

(Lamb, 1984)

1976)

( )

(L.D.L)

(Sharkey, 1984)

(H.D.L)

(Hager, et al 1995)

)

( )

(HR)

( )

(HR)

\_\*

:  
(HR)

.(Lean Body Mass)

)

(HR)

(4)

.(

(HR)

( )

( )

.(5)

( $\alpha = 0.05$ )

(HR)

( )

(Recovery)

(Goble

(Janz et. al. 1993)

et. al. 1992)

(Malcomlm et. al. 1993)

(Saris, 1986)

(Freedson, 1989)

(HR)

(HR)

(HR) (S.V.) ) (HR)  
) (  
(  
(HR) .(S.V.)  
(HR) .  
( )  
( )  
(Hernansen, et al.1990)  
(Gutin,et.al.)  
(HR)  
(HR) (S.V.) (S.V.) (Cardiac Output)  
(HR) (HR) (HR)  
(S.V.) (S.V.)  
(S.V.) ( )  
(HR) (S.V.)  
(HR) (HR) (S.V.)  
(S.V.) ( )  
(VO2max) (HR) (HR)  
(HR)

.( )

$$: \quad \text{PWC170 VO2max} \quad -$$

$$(4)$$

VO2max PWC170

$$\text{VO2max PWC170}$$

$$(\alpha = 0.05)$$

$$(HR) \quad (5)$$

$$(HR) \quad \text{PWC170}$$

$$\text{PWC170} \quad ( \quad )$$

$$(N1+N2)$$

( )

PWC170

.(Pivarnik et. al. 1996) (Tolfrey et. al. 1998)

VO2max

PWC170

VO2max

(Step Test)

(PWC170) (VO2max)

(VO2max)

(Yates and Grane)

( /170)  
) (1976 ) (1973 )  
(1979 ) (1979 )  
(1980 )

VO2max PWC170

VO2max (PWC170)

(VO2max)

( )

(Watson,

1978)

(HR)

(Step-Test)

.PWC170

(S.V.)

-\*

:

-1

(PWC170)

(HR)

(VO2max)

(6)

(Step-Test)

(HR)

(Step-Test)

(PWC170)

(Lean Body Mass)

VO2max

(HR)

.VO2max

(HR)

(S.V.)

(S.V.)  
(S.V.)

( ) (HR)  
(S.V.) (HR)  
(S.V.)  
( ) (S.V.) (HR)

(Turley, and , Wilmore, 1995) (HR) (S.V.)

( ) (HR)  
(S.V.)

(6)  
(Cardiac Output)  
( )

(Step-Test)

-2  
**PWC170** (S.V.)  
(6)

(Durant, et. al. 1993)

(Step-Test) (H.D.L)

( ) (N1+N2) (L.D.L)  
(PWC170)

(S.V.)

(PWC170) (Cardiac (HR) Output)

( / / )VO2max ( ) (PWC170)  
 ( / /VO2) (PWC170)

(Rowell, 1986)  
 %16 (12-8)  
 VO2

(Boyajlan and Rowland. 1995) (1987)  
 VO2max 24  
 (PWC170)

(Katach, 1983) ( $\alpha=0.05$ )  
 %80  
 (CRF) (HR)  
 Cardiorespiratory Fitness  
 (VO2max)  
 (1982) (Consliman)

(S.V.)  
 VO2max  
 (Davies et. al. 1974) (1986 )  
 (Glick and Shwartz 1972) (Shoen Feld et. al. 1981)  
 (Pivarnik and Dwyer, 1996)  
 VO2max  
 VO2max  
 (Salin et. al.)  
 (Panye, and Morrow, 1993)

**-3**

- (1995 )

.( ) .( 1000)

( ) (VO2max) (PWC170)

( / / /VO2max)

(S.V.)

(1982 )

(Lamp 1984)

1982

1980

1984

1992

1992

(14)

1989

1980

- Corbin, C.B. Flexibility, *Clin Sports med.* (3) 1984. ) PWC170 / 170
- David, D. et al. 1987. The effects of resistance training on aerobic and on aerobic power of young boys, *Medicine and Science in Sports and Exercise*, 19 (4). ( 15-12  
1989
- Docherty, D. Wenger, H. A. and Collis, M. L. 1987. The effects of resistance training on aerobic and an aerobic power of young boys, *Medicine and Science in Sports and Exercise*, 19 (4). 1996
- Durant, R.H., et al. 1996. Association among serum lipid and lipoprotein concentrations and physical activity, physical Fitness and body composition in young children, *J. pediatr*, 123 (2). 1986  
20 -18
- Epstein, L. H. et al.: Determinants of physical activity in obese children assessed by accelerometer and Self-report. *Medicine and Science in Sports and Exercise*, 28 (9). 1989
- Epstein, L.H., Klein, K.R. and Wisniewske. L. 1994. Child and parent factor that influence psychological problems in obese children. *Int J. Eating Disord*, (15). .1  
:1992
- Espstein, L. H., Masek, B.J. and Marshall. W.R. 1978. A nutritionally based school program for control of eating in obese children, *Behavior Therapy*, (9). 1993
- Gilliam, T.B., et al. 1981. Physical activity patterns determined by heart rate monitoring in 6-7 year old children. *Med. Sci sports Exec.* 13: 6567. 1995
- Gutin, B. et al. 1997. Effect of physical training on heart period variability in obese children. *J pediatric*, (130).
- Gutin, B. et al. 1990. Blood pressure, Fitness in 5- and 6- year old children, *JAMA, U.S.A.*, 264 (4). 1997
- Hager, R. L., Tucker. L. A. and seljaas. G.T. 1995. Aerobic Fitness, blood Lipids, and body fat in children. *AMJ public Health*, 58 (12).
- Janz, K.F. and Mahoney, L.T. 1995: Tow year follow - up on the impact of physical fitness and Body fatness on children Heart Growth and Rising Blood pressure. The muscation Study, *Pediatric Exercise Science*, 7 (4).
- Jukkat, V. 1988. Evaluation of Explosive Strength for young and Adults Athletes; *Research Quartile for Exercises and Sports*, sq (1).
- Kemper. H. C. G. and willem. V.M. 1996. Physical Fitness Testing of children: European perspective, *ped, Exerc, Sci*, and 8 (3).
- Lamp, D. 1984. *Physiology of Exercise Response Adaptation*, 2<sup>nd</sup> ed, Macmillan, publishing company, Incusa.
- Lewis, C.E. and Lewis, M. A. 1974. The impact of television commercials on health - related beliefs and behaviors of Al-Hazzaa, M.H. et al. 1998. Cordiorespiratory Responses of Trained Boys to Tread Mill and arm Eryometry: Effect of Training Specificity, *Pediatric Exercise*, 10(3).
- Beam, A. 1980. Comparison of motor ability of females with older siblings over six years of physical Growth, *Dissertation International Abstracts*. A. 1, 40(10).
- Beunen, G., R., et al. 1991. Physical activity and growth, maturation and performance: alongitudinal, study. *Medicine and Science in sports and Exercise*, 24 (5).
- Conversion, V. A. 1997. Cardiovascular consequences of bed rest: effect on maximal oxygen uptake, *Medicine and Science in Sports and Exercise*, (29) 2.
- Conversion, V.A. et al. 1994. Effect of simulated microgravity on cardiopulmonary boroerflex control of forearm vascular resistance. *A.M.J. Physiology*, 260.

- Exerc., 24 (8).
- Raudsepp, L. and Juryman, T. 1996. Physical activity, fitness, and Adiposity of prepubertal Girls, *Pediatric Exercise Science*, 8(3).
- Robbins, C.W. 1984. Alamba motor fitness and health related fitness normal., *Dissertation Abstracts International*, A, 45 (1).
- Rowland, T.W. and Boyajian, A. 1995. Aerobic response to endurance exercise training children, *Pediatrics*, 96.
- Seqis, D. and Mullin, J. 1982. VO<sub>2</sub>max in variable type exercise among well. Turned upper body athletes. *Res Quart Exerc sport*, 53.
- Sinaki, M. et al. 1996. Correlation of trunk muscle strength with age in children 5 to 18 years old. *Mayo clin proc*, 71.
- Sharkey, B. J. 1984. *Physiology of Fitness*, 2<sup>nd</sup>, ed Human Kinetics.
- Stratton, G. 1996. Children's heart rate during physical education lessons, a review, *ped. Exerc. Sci.*, 8.
- Tolfrey, K. and Armstrong, N. 1995. Child - adult differences in whole blood lactate responses to in cremental treadmill exercise, *Br. J Sports Med*, 29(3).
- Tolfrey, k. Compbell, L.G. and Batter ham, A.M. 1998. Aerobic Train ability of prepubertal boys and girls, *pediatric Exercise Science*, 10 (3).
- Teuth, M.S.et al. 1998. Energy expenditure and physical fitness in overweight vs. non- overweight prepubertal girls. *Int Jobs Relate Metal Disord*. 22 (5).
- Tucker, L.A. et al. 1997. Body fat Percentage of children varies according to their, Diet composition, *JAM Diet Assoc*, U.S.A., (97) 9.
- Turley, K. R. and Wilmore, J. H. 1997. Sub maximal Cardiovascular Responses to Exercise in children: Treadmill Versus cycle Ergometer, *pediatric Exercise Science*, 9 (4).
- Unnithan, V.B. et al. 1995. Reproducibility of cordiorespiratory measurements during sub menial and maximal running in children, *Br. J. Med*, 29 (1).
- Watson, A. W. 1978/ Assessment of the Cardiovascular Fitness of sportsmen in the *Journal of Sports Medicine and physical Fitness*, 18 (2), Minerva medical pub, Italy.
- Wilmore, J. H. and Costill, D. L. 1994. *Physiology of sport and exercise*. Human Kinetics.
- children, *Pediatrics*, 53.
- Londeree, B.R. and Moesch Berger M. L. 1984. Influence of age and other factors on maximal rate. *J. cardiac Rehabil*.
- Maline, R. and Bouchard, C. 1991. *Growth Maturation and physical Activity* Champaign. IL, Human Kinetics.
- Marshall, et al. 1998. Tracking of health - related fitness Components in youth ages 9 to 12. *Med Sci Sports exercise*, 30 (6) .U.S.A.
- Mellin, L. M. 1988. Adolescent obesity, *Journal of Dentistry For children*.
- Miller, W.C. Wallace, J. P. 1993. Predicting Max HR and the HR - VO<sub>2</sub> relationship for Exercise prescription in obesity. *Medicine and Science in Sports and Exercise*, 25, 9.
- Neumann, C.G. 1977. Obesity in pediatric practice: Obesity in the preschool and school - age Child, *Pediatric Clinics of North America*, 24 (1).
- Newcomer, K. Sinak, M. and wollan, P.C. 1997. Physical activity and four - year development of back strength in children. *Am. J. Phys. Med. Rehabil*, 76.
- Nordstrom, P. et al. 1996. Local bone mineral density, muscle strength, and exercise in adolescent boys: Comparative study of tow groups with different muscle strength and exercise levels, *Calcalif Tissue Int*. 58.
- Perry, A.C. et al. 1997. Fitness, diet and coronary risk factors in a sample of Southeast tern U.S. Children, *Apple Human Sci.*, 16 (4) U.S.A.
- Peter, T.K. et al. 1998. Physical Activity and Health - related fitness in youth. Multivariate analysis. *Medicine and Science in Sports and Exercise*, 30 (5).
- Piscopo, Baley. 1981. *Kinesiology, The Science of Movement*, John Willy and Sons Inc., Canada.
- Pivarnik, J.M. Toylar, W.G. and Cumming, S.S. 1998. Longitudinal Assessment of aerobic fitness in Middle School African - American girls, *pediatric Exercise Science*, 10.
- Pevarnik, J.M. Lauderdale, M.A. and Dwyer, M.C. 1996. The reliability of aerobic capacity (VO<sub>2</sub>max) testing adolescent girls, *Res. Q. Exerc. Sport*, 67.
- Pratt, M. 1989. Strength Flexibility and maturity in adolescent athletes, *Am. Dis children*, (143).
- Railakari, O.T. et al. 1997. Associations between physical activity and risk Factors for coronary heart disease, the cardiovascular Risk in young Finns study, *Med Sci Sports*

## **Fat Percentiles and Their Disparity Effect on Some Physiological variables on Sample of Children**

*Mahmoud S. Azab\**

### **ABSTRACT**

Fat Percentiles and Their Disparity Effect on Some Physiological variables on sample of children, this study aims at identifying of disparity effect of fat percentiles on some Physiological variables of children and also to knowing the relations between Physiological variables and disparity of fat percentiles.

To achieve the aim of the study, the researcher proposed the following hypotheses:

First: There is an effect of fat percentiles in children on some Physiological variables.

Second: There is an effect of fat percentiles disparity in children relations among variables.

The sample of this study consisted of (209) children between the ages of (10-12). This sample was classified according to the fat percentage in the body and in accordance with Lohman formula. A group of tests were carried out on the sample such as the thickness of skin layer to identify the fat percentage, PWC170 using the step box, to get the absolute percentage of PWC170 using carpman formula, and the maximum level of oxygen consumption (VO<sub>2</sub>max) was calculated indirectly depending on the value of PWC170 indicator.

Depending on the statistical analysis, the researcher concluded that the high percentages of fat levels in the body affect negatively the physiological variables (VO<sub>2</sub>max, PWC170).

The researcher recommend, that more attention and care are needed in regard to physical activities in school due to the fat that these activities can lower the percentages of fat levels in the body, and as a result, the negative effects on the child's physical and physiological suitability. The researcher also recommends that more researches must be done on other groups of children with different ages.

**Keywords:** Fat Percentiles, Physiological Variables, Children.

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