Growth pattern among children (age 0-18 years) use of percentiles: 5 Anthropometric measurements

Snehal M. Dharmadhikari[1], Dr. Avinash H. Salunkhe[2], Dr. Jyoti A. Salunkhe[3], Dr. Vaishali R. Mohite[4], Dr. Satish V. Kakade[5]

[1]MSc (N), Ph D Scholar, Krishna Vishwa Vidyapeeth Deemed to Be University, KINS, karad
[2]PhD, Professor, Research Guide, Krishna Vishwa Vidyapeeth Deemed to Be University, Karad
[3]PhD, Professor, Krishna Vishwa Vidyapeeth Deemed to Be University, KINS, Karad
[4]Principal / Dean, Krishna Vishwa Vidyapeeth Deemed to Be University, KINS, Karad
[5]PhD, Professor, Krishna Vishwa Vidyapeeth Deemed to Be University, KIMS, Karad

ABSTRACT

Background: The study of physical growth comprises of a comprehensive understanding of health status. Growth and development are indicators of health and nutritional status of a population. *Objective:* To study growth pattern among children (aged 0-18 years) use of percentiles. *Methodology:* A descriptive cross- sectional study was undertaken among in Maharashtra; District-Satara, under Karad Taluka randomly selected a village from PHCs. By using random sampling technique, the sample consists of 992 earlier children belonging to both sexes (boys-465; girls-527) who are considered for 5 anthropometric measurements. *Result:* The findings suggest that according WHO recommendation comparison present study finding was percentile values less but increasing gradual according age wise. There was correlation association between head circumference and chest circumference, according age wise observed growth in children. *Conclusion:* It is apparent from the above discussion that the growth pattern of earlier children (0-18 year) among the increasing gradually. There was correlation association between head circumference and chest circumference, according age wise observed growth in children.

Keywords: Children, Anthropometric measurements, Percentile

1. Introduction

Growth and development are indicators of health and nutritional status of a population. Growth is a product of the continuous and complex interaction of heredity and environment (Tanner, 1978). The study of physical growth comprises of a comprehensive understanding of health status. Anthropometric measurements such as weight, height, head circumference, chest circumference and mid arm circumference are valuable indicators to assess growth of children. Normal growth comprises all dynamic, physiologic and psychological changes which take place from conception to maturity [1]. The term 'growth' has commonly been used for those aspects of maturation which can be described by a measurement of size [2].

India is a developing country since under the major nutritional transition stage.[3] in 2006, WHO developed the first single uniform global growth standard as prescriptive chart for the children under the age of 5 years with encouragement to all countries for its applicability. [4] A growth standard reflects optimal growth, suggesting that all children have the potential to achieve that level, while a growth reference is simply the distribution used for comparison (WHO MGRSG 2006a). Percentiles in anthropometric measures have been widely used to help assess young people's growth, such as examples; under nutrition and over nutrition, overweight and obesity.

2. Objective

To assess growth pattern among children (aged 0-18 years) use of percentiles

3. Methodology

A descriptive cross- sectional study was undertaken among in Maharashtra; district-Satara, under Karad Taluka randomly selected a village from PHCs. By using random sampling technique, the sample consists of 992 earlier children belonging to both sexes (boys-465; girls-527) who are considered for 5 anthropometric measurements. The present study is intended to focus upon the differential growth trends, health status among children aged 0 to 18 years. The data was collected by using the standard instruments such digital weighing machine, measuring Tape. The entire data was entered in MS- Excel and statistical analysis was done using the software SPSS (Version 26.0)

4. Result

The anthropometric measurements showing percentile values according age group wise in Table 1, 2, 3. The findings suggest that according WHO recommendation comparison present study finding was percentile values less but increasing gradual according age wise.

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Table1. Distribution of Weight & Height of earlier children according Percentile (n =992)										
Age of earlier children	Percentile values for Weight (Kg)					Percentile values for Height (Cm)				
	3	5	10	25	50	3	5	10	25	50
(0-6) 6month	1.8	1.8	2.16	3.0	5.0	42.0	42.0	42.6	46.0	53.0
(6-12) 1year	3.9	4.39	5.0	5.27	6.35	30.0	34.5	41.8	49.0	60.5
(12-18)1 ½ year	4.64	6.10	6.76	8.0	9.0	43.2	50.2	52.8	60.0	72.0
(18-24)2year	8.0	8.0	8.0	9.0	10.0	40.0	40.0	42.0	61.0	75.0
(24-36)3year	6.04	7.0	7.0	8.50	10.0	60.0	62.0	69.2	76.0	84.0
(36-48)4year	7.0	8.25	9.0	10.0	11.0	67.9	70.7	75.0	82.0	90.0
(48-60)5year	9.0	9.99	10.0	12.0	13.0	74.1	75.0	81.6	88.5	99.0
(60-72) 6year	10.0	10.0	11.0	14.0	15.0	77.48	80.0	86.2	96.0	102.0
(72-84)7year	11.94	13.0	13.0	15.0	16.0	71.88	80.8	87.9	98.75	107.0
(84-96)8year	13.0	13.65	14.3	15.25	19.0	79.19	80.0	87.3	104.2	112.0
(96-108)9year	14.0	14.02	15.0	17.0	20.0	88.86	92.3	101.0	107.2	116.0
(108-120)10year	10.86	13.2	15.0	17.0	20.0	75.94	92.8	101.2	108.5	120.0
(120-132)11year	14.31	15.95	16.0	20.0	25.0	86.55	96.6	110.0	118.75	128.0
(132-144)12year	15.53	16.55	20.0	22.0	28.0	92.65	97.2	110.0	120.0	130.5
(144-156)13year	16.46	18.15	22.0	25.25	30.0	64.04	101.3	110.0	130.0	139.5
(156-168)14year	15.92	19.05	22.1	26.0	32.0	109.2	110.4	120.0	132.7	141.0
(168-180)15year	22.0	22.0	25.0	29.25	35.0	95.0	104.7	115.8	130.0	141.0
(180-192)16year	28.0	28.0	28.0	32.50	35.0	110.0	110.0	120.4	139.5	150.0
(192-204)17year	35.0	35.0	39.0	40.0	42.0	119.0	119.0	140.0	145.0	147.0
(204-216)18year	33.0	33.2	35.6	40.0	42.0	118.0	120.0	140.0	146.0	152.0

Table2. Distribution of Head Circumference & Chest Circumference of earlier children according to Percentile (n =992)										
Age of earlier children	Percentile values for Head circumference (Cm)					Percentile values for Chest Circumference (Cm)				
	3	5	10	25	50	3	5	10	25	50
(0-6) 6month	20.0	20.0	20.0	28.0	32.0	20.0	20.0	20.6	28.0	34.5
(6-12) 1year	12.0	15.6	22.7	27.7	36.5	14.0	16.7	22.7	30.0	37.0
(12-18)1 ½ year	29.2	32.0	35.0	40.0	45.0	33.0	33.2	35.0	40.0	44.0
(18-24)2year	19.0	19.0	19.0	36.0	45.0	21.0	21.0	25.0	37.5	45.0
(24-36)3year	20.3	29.0	30.0	39.0	44.0	27.1	30.0	34.4	40.0	45.0
(36-48)4year	20.0	25.2	30.0	40.0	45.0	25.8	31.2	35.0	40.0	44.5
(48-60)5year	27.8	31.9	37.6	41.0	47.0	31.9	34.2	38.0	43.2	49.0
(60-72) 6year	36.32	38.0	40.0	42.0	48.0	34.6	38.0	40.1	44.0	50.0
(72-84)7year	27.94	30.0	33.0	42.0	48.0	37.7	38.0	40.0	45.7	50.2
(84-96)8year	25.1	31.8	36.7	43.2	48.0	34.1	35.6	44.0	48.0	52.0
(96-108)9year	29.4	32.0	38.0	44.0	48.0	36.5	41.0	42.0	46.0	52.0
(108-120)10year	29.4	33.1	38.2	43.5	49.0	33.5	36.6	40.2	48.0	52.0
(120-132)11year	38.7	39.0	40.0	45.0	50.0	38.1	41.4	45.9	48.7	55.0
(132-144)12year	30.5	34.8	39.1	46.5	50.0	35.8	38.8	45.1	50.0	55.0
(144-156)13year	31.0	31.1	35.5	45.2	50.0	38.8	40.2	48.0	50.0	55.0
(156-168)14year	30.0	30.5	40.2	50.0	52.0	24.0	37.6	44.1	54.0	60.0
(168-180)15year	36.0	36.0	36.6	42.7	49.5	35.5	38.4	43.3	49.2	55.0
(180-192)16year	32.0	32.0	42.4	48.0	52.0	38.0	38.0	49.2	57.0	60.0
(192-204)17year	45.0	45.0	49.0	51.0	53.0	50.0	50.0	52.0	54.0	56.0
(204-216)18year	41.0	41.3	44.0	49.0	52.0	40.0	40.9	49.2	52.5	60.0

Table3 .Distribution of mid arm circumference of earlier children according Percentile (n =992)					
Age of earlier children	Percentile values for Mid Arm Circumference (Cm)				
	3	5	10	25	50
(0-6) 6month	4.0	4.0	4.6	7.0	10.0
(6-12) 1year	2.0	2.0	2.0	5.0	10.0
(12-18)1 ½ year	4.0	4.0	5.8	11.0	14.0
(18-24)2year	9.0	9.0	10.0	10.0	14.0
(24-36)3year	4.0	4.4	5.0	8.0	14.0
(36-48)4year	5.9	6.0	6.2	10.0	14.0
(48-60)5year	6.0	6.0	7.0	10.0	14.0
(60-72) 6year	7.0	7.0	7.0	10.0	15.0
(72-84)7year	6.4	7.4	8.9	14.0	15.0
(84-96)8year	8.0	8.6	10.0	14.0	16.0
(96-108)9year	8.1	10.0	11.1	15.0	16.0
(108-120)10year	8.8	9.2	12.0	15.0	17.0
(120-132)11year	11.3	12.9	13.4	16.0	18.0
(132-144)12year	9.7	11.1	14.0	16.8	18.0
(144-156)13year	13.6	14.0	16.0	17.0	19.0
(156-168)14year	16.1	16.5	17.0	18.2	20.0
(168-180)15year	8.0	11.9	14.4	18.0	18.7
(180-192)16year	12.5	12.5	15.3	19.0	21.5
(192-204)17year	16.0	16.0	19.0	21.0	23.0
(204-216)18year	14.5	14.6	16.1	19.7	22.0

5. Discussion

For each age group there was gradual increase in weight, Height, Head Circumference, Chest circumference and mid arm circumference from 3rd percentile to 50th percentile. 3rd, 5th, 10th , 25th, & 50th percentile of weight revealed gradual increase from 0-6 to 18 year old earlier child with expectation that 5th percentile weight of 108-120 month (10yrs) child found decline in comparison to its previous age group [96-108month(9yrs)] but, accelerated afterwards. In 3rd, 5th, 10th, 25th, & 50th percentile of
height revealed gradual increase from 0-6 month earlier child to 18 year old child with expectation that 5th percentile height of 6-12 month, 18-24(1 ½ -2 yrs) child found decline in comparison to its previous age group [0-6month and 12-24(1 ½ yrs)]. With expectation that 10th percentile height of 6-12 month, 18-24(1 ½ -2yrs) child found decline comparison to its previous age group [0-6month, 12-84(1 ½ yrs)] but, accelerated afterwards.
3rd, 5th, 10th, 25th & 50th percentile of head circumference revealed gradual increase from 0-6 month earlier child to 18 year child with expectation that 5th percentile head circumference of 6-12(1yrs), 18-24(1 ½ -2yrs), 36-48(4yr), 72-84(7yr) child found decline in comparison to its previous age group [0-6month, 12-18(1yr-1 ½ yr), 24-36(3yr), 60-72(6yr)] with expectation that 10th percentile head circumference of 18-24(2yr), 72-84(7yr), 132-144(12yr), 144-156(13yr) & 168-180(15yr) child found decline in comparison to its previous age group [12-18(1- 1 ½ yr), 60-72(6yr), 120-132(11yr), 132-144(12yr), & 156-168(14yr)] with expectation that 25th percentile head circumference of 18-24(1 ½ -2yr), 24-36(3yr), 108-120(10yr), 168-180(15yr) child found decline in comparison to its previous age group [12-18(1-1 ½ yr), 18-24(1 ½ -2yr), 96-108(9yr) & 156-168(14yr) but, accelerated afterwards. 3rd, 5th, 10th, 25th, 50th percentile of chest circumference revealed gradual increase from 0-6 month earlier child to 18 year old earlier child with expectation that 5th percentile chest circumference of 6-12(1yr), 18-24(1 ½ - 2yr), child found decline in comparison to its previous age group [0-6month, 12-18(1.1 ½ yr)] but, accelerated afterwards.
3rd, 5th, 10th, 25th,50th percentile of MAC revealed gradual increase from 0-6month earlier child to 18 year old earlier child with expectation that 5th percentile MAC of 6-12 month(1yr), 24-36(3yr), child found decline in comparison to its previous age group [0-6month, 18-241 ½ - 2yr)], with expectation 10th percentile MAC of 24-36(3yr) child found decline in comparison to its previous age group [18-24(1 ½ -2yr)] but, accelerated afterwards.

Conclusion

It is apparent from the above discussion that the growth pattern of earlier children (0-18 year) among the increasing gradually, after one year of child chest circumference increasing than head circumference. There was correlation association between head circumference and chest circumference, according age wise observed growth in children.

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Ethical Approval

Ethical approval was obtained from ethical institutional committee of KIMSDU, Karad on 1december 2020 and approval number was KIMSDU/IEC/01/2020.

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