Original Article

Presentation Weight Indices for Patients with Cleft and Non-Affected Children: A Two-Centre Study

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Abstract

Background: Children with cleft lip and/or palate (CL/P) face many challenges in the society. They tend to suffer malnutrition and therefore poor weight gain due to lack of standard care, especially from their parents and society at large. The poor weight gain leads to delayed surgical repair of the cleft abnormality leading to prolonged nutritional and psychological challenges for all concerned. **Objective:** The aim of the study was to determine if children without cleft abnormalities presenting for routine immunisation and children with cleft abnormalities are both likely to be less than the 75th percentile of expected weight at the time of presentation, and if there is any difference in presenting weight amongst children with different cleft types. **Materials and Methods:** This was a retrospective study. Data of children that attended the immunisation clinic of the Department of Primary Health of the National Orthopaedic Hospital, Enugu, and routine surgical clinic of the National Orthopaedic Hospital, Enugu, Nigeria, and the Good Shepherd Specialist Hospital, Enugu, Nigeria, between January 2010 and December 2014 with a diagnosis of CL/P, were obtained from the medical records. The data were analysed with SPSS and the confidence interval was 95%. **Results:** A total of 923 medical records were reviewed for the study, out of which 363 were for children with cleft abnormalities. There was no significant difference in the weight of the children without cleft and presenting for routine immunisation compared with their expected 75th percentile, or children with cleft abnormality compared with their expected 75th percentile (either in their first or in their second visits). With the children that presented with CL/P, there was a significant difference noted amongst children with both CL/P deformity with the expected 75th percentile weight, irrespective of whether the combination was unilateral or bilateral, with $P = 0.041$. This difference was noted in their first visit. **Conclusion:** Children with combined CL/P are at risk of presenting with poor weight. Nutritional rehabilitation considered early with children with cleft and particularly those children with combined CL/P.

Keywords: Cleft lip and palate, Enugu, Nigeria, presentation weight

Introduction

Cleft lip and/or palate (CL/P) is one of the most common congenital craniofacial birth defects in the head-and-neck regions.[1] According to the World Health Organization (WHO), worldwide, one in 500–700 individuals are born with this defect[2] and this rate varies significantly across geographical regions.

Difficulty in feeding is one of the frequently reported problems in children with CL/P,[3] and hence, malnutrition is usually a characteristic feature in these children.[4,5] The risk of developing feeding difficulties is high amongst children with cleft palate.[6] A number of studies have looked at birth weights in children born with CL/P.[7-9] The results differ but suggest that babies with CL/P weigh less and smaller than babies without a cleft. The observed differences in results may be due to confounding factors such as maternal age or parity[9] or other social factors. One study report found that infants with an isolated cleft lip only were similar in weight with babies without a cleft. However, those infants born with either a cleft palate or a CL/P were found to weigh less.[9]

The feeding problems encountered in children with CL/P include ineffective sucking due to inability in generating adequate negative pressure in the oral cavity, milk regurgitation

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through the nasal cavity and choking as a result of incomplete facial and structural defects in palate causing decreased food intake.[10] Usually, before cleft restoration surgeries are performed on these patients, they often have feeding issues and airway infections, resulting in malnutrition and developmental delays, including slow growth and poor weight gain.[7,11]

The growth pattern of the majority of patients with CL/P appears to be markedly abnormal, while some patients still follow a relatively normal pattern of weight and length attainment.[12-15]

This study compared the presentation weights of children born with cleft deformity and those presenting for routine immunisation each with the 75th percentile of the WHO expected weight.

Null hypothesis

Patients with cleft deformity are just as likely as their counterparts without deformity presenting for routine immunisation to be outside the 75th percentile of the WHO expected weight.

This will allow us to be guided by scientific evidence when offering recommendations that will improve the practice of early cleft repair. Timely identification of feeding problems and appropriate nutrition support are key to ensuring healthy development of the affected child.[16]

Materials and Methods

This is a hospital-based retrospective study that looked at the records of children that presented for cleft surgery at the National Orthopaedic Hospital, Enugu, Nigeria, and Good Shepherd Specialist Hospital, Enugu, Nigeria, and children presenting for routine immunisation at the Department of Public Health of National Orthopaedic Hospital, Enugu, Nigeria, over a period of 5 years from January 2010 to December 2014. The Department of Public Health of National Orthopaedic Hospital, Enugu, Nigeria, is an approved centre for immunisation which serves the hospitals and the community of Enugu. Children, both those with or without cleft deformity, present to there for routine immunisation. They are usually weighed and their records kept. The presenting weights of each group were matched with the 75th percentile of the WHO expected weight chart. Both hospitals are centres for free cleft care and receive such patients from the entire south east and parts of the south south and north central geopolitical zones of Nigeria. A total of 935 children presented for routine immunisation within the period of review. Twelve patients were excluded from the study due to incomplete data. Five hundred and sixty children had no cleft abnormality while 363 children had one form of cleft abnormality or the other and served as cases. The high number of cleft cases is a result of the fact that both hospitals partner with Smile Train for the free treatment of CL/P. The diagnosis was made by the plastic surgeon. None of them had nutritional intervention by any group prior to enrolment into the study. Five hundred and sixty children presenting in the period with no obvious abnormality were compared with the 75th percentile to help determine if any abnormal results were peculiar to the locality. This study was approved by the Ethical Board of National Orthopaedic Hospital, Enugu, Nigeria. Standard Infant and Toddler scales (SALTER, Model 180, made in England) were used to measure the weight of the babies. The weights were compared against the WHO expected weight for age at 75th percentile [Appendixes 1 and 2].

Data analysis

The data analysis was by descriptive and inferential statistics using the Statistical Package for Social Scientist (SPSS) version 20.0 (IBM SPSS Statistics for Windows, version 21.0. Armonk, NY: IBM Corp). Univariate analysis was carried out for demographic variables to obtain their frequency. Student's *t*-test was used to test the significance of difference between mean values. Bivariate analysis using Pearson's Chi-square was used to compare categorical variables for significance of difference in the case and control groups. A $P < 0.05$ was set as level of significance.

Table 1: Sociodemographic

Variables	Children without cleft			Children with cleft		
	Frequency	Percentage	Mean	Frequency	Percentage	Mean
Sex						
Male	289	51.6		37	10.2 (32.7)	
Female	270	48.2		70	20.9 (67.3)	
No response	1	0.2		250	68.9	
Total	560	100.0		363	100.0	
Age (months)						
0-3	201	35.9	5.58	89	24.5 (35.3)	17.94
>3-6	153	27.3		41	11.3 (16.3)	
>6-9	155	27.7		13	3.6 (5.2)	
>9-12	29	5.2		42	11.6 (16.7)	
>12	22	3.9		67	18.5 (26.6)	
No response	0	0.0		111	30.6	
Total	560	100.0		363	100.0	

Results

Three hundred and sixty-three subjects were children with obvious cleft deformity and 560 children presenting for routine immunisation with no obvious anomaly was the second group. The age and gender distribution of the study population is shown in Table 1.

Distribution of the cleft children studied showed a slightly lower than half of the total being isolated lip. About one-third of the total number of children studies had cleft of both the lip and palate which are either unilateral or bilateral [Table 2].

With respect to the weight of the control group, there was no significant difference found in the mean weight as recorded at presentation and expected weight with $P = 0.684$ [Table 3].

There was also no significant difference with the expected 75th percentile weight of the children without obvious cleft group or the group with obvious cleft abnormality neither in their first nor in their second visits [Table 4, $P = 0.061$ in the first visit and 0.479 in the second visit]. With the children that presented with CL/P, there was a significant difference with the expected 75th percentile weight noted amongst children with both CL/P deformity, irrespective of whether the combination was unilateral or bilateral, with $P = 0.041$. This difference was noted in their first visit.

Table 2: Percentage distribution of cases based on their diagnosis

Different conditions	Frequency	Percentage	Valid percentage
Isolated palate	70	19.3	19.4
Isolated lip	172	47.4	47.6
Lip and palate (unilateral and bilateral)	119	32.8	33.0
Total	361	99.4	100.0
No response	2	0.6	
Total	363	100.0	

Table 3: Mean comparison between weight at presentation and expected body weight of the children without cleft in Enugu

Category	Mean±SD	*t*	*P*	Decision
Weight at presentation	7.1329±2.04767	0.407	0.684	No significant difference
Expected weight	7.0839±1.81911			

SD: Standard deviation

Table 4: Mean comparison between weight at presentation and expected weight cases

Diagnosis	Presentations	Status	Mean±SD	*P*
Total pulled together	First	Body weight	8.66±7.36	0.061
		Expected body weight	9.99±7.86	
	Second	Body weight	9.51±5.76	0.479
		Expected body weight	10.45±5.25	
Isolated palate	First	Body weight	10.73±7.94	0.414
		Expected body weight	12.04±8.01	
	Second	Body weight	12.97±6.79	0.490
		Expected body weight	15.75±6.34	
Isolated lip	First	Body weight	9.26±7.93	0.457
		Expected body weight	10.17±8.55	
	Second	Body weight	7.09±3.50	0.284
		Expected body weight	8.34±3.15	
Lip and palate (unilateral and bilateral)	First	Body weight	6.70±5.78	0.041*
		Expected body weight	8.69±6.83	
	Second	Body weight	9.99±6.19	0.370
		Expected body weight	12.46±6.22	

*Significant $P<0.05$. SD: Standard deviation

Discussion

The children without obvious cleft abnormality who presented for routine immunisation met the expected weight for their age according to the WHO standard [Appendixes 1 and 2]. When the expected weight of children with cleft abnormality was compared with the 75th percentile, it was found that the difference was not significant. This agrees with the study done by some authors[7-9,17,18] which found that infants with CL/P weigh less and smaller than infants without a cleft. Becker also found that infants with an isolated cleft lip only did not weigh less than babies without a cleft.[9] This was true in our own study during both the first and the second visits.

However, it was found that there existed a significant difference amongst those children with combined CL/P irrespective of whether the CL/P were on one of both sides. For this group, the mean weight at the first visit was 6.7 ± 5.78 while the expected weight was 8.69 ± 6.83. A study reported that those infants born with either a cleft palate or a CL/P were found to weigh less.[9] From our study, the babies in the cleft groups were more likely to weigh less than the expected WHO 75th percentile than their counterparts presenting for routine immunisation without deformity, but this was not statistically significant. However, a significant difference was found amongst the children with combined CL/P compared with the expected WHO 75th percentile and not amongst children with cleft palate alone. This may be as a result of neglect from fear and poor parental bonding with the children with cleft, not just the anatomic anomaly. It has been previously shown that mothers of children with cleft have a significant tendency for psychiatric symptoms.[19,20] This would affect their care of the children.

At the second visit however, there was an improvement, but it was not significantly different. This may be explained by the fact that at the first presentation, the patients with cleft were usually reviewed by the nutritionist in the hospital who usually gives the much-needed nutritional advice to the mothers. The improvement in the weight during the second visit, is usually a reflection of adherence to such advice by mothers. Such interactions need strengthening to result hopefully in significant weight gain. This is also in consonant with previous studies where it was noted

that despite the initial lag in weight gain, there seems to be an eventual catch-up between 6 months and 3 years of age.[7,10,21]

Conclusion

Children with no cleft abnormality who present for routine immunisation have no significant difference in their mean weight compared with their expected 75th percentile, neither do those with cleft abnormality. However, there is a significant difference noted when the mean weight at presentation of the children with both CL/P, irrespective of whether it is unilateral or bilateral cleft abnormality, was compared against the expected for their age.

This study has noted that children born with both CL/P irrespective of whether it is on one or both sides, are at a greater risk of having low weight, especially in their infancy when compared to those with isolated cleft lip or palate. Routine nutritional evaluation and support for those with CL/P is advocated.

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Conflicts of interest

There are no conflicts of interest.

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Appendix 1: World Health Organization Expected Weight for Age for Children ≤5 years (boys)

Weight-for-age BOYS

Birth to 5 years (percentiles)

World Health Organization

					Percentiles (weight in kg)										
Year: Month	Month	L	M	S	1st	3rd	5th	15th	25th	50th	75th	85th	95th	97th	99th
0: 0	0	0.3487	3.3464	0.14602	2.3	2.5	2.6	2.9	3.0	3.3	3.7	3.9	4.2	4.3	4.6
0: 1	1	0.2297	4.4709	0.13395	3.2	3.4	3.6	3.9	4.1	4.5	4.9	5.1	5.5	5.7	6.0
0: 2	2	0.1970	5.5675	0.12385	4.1	4.4	4.5	4.9	5.1	5.6	6.0	6.3	6.8	7.0	7.4
0: 3	3	0.1738	6.3762	0.11727	4.8	5.1	5.2	5.6	5.9	6.4	6.9	7.2	7.7	7.9	8.3
0: 4	4	0.1553	7.0023	0.11316	5.4	5.6	5.8	6.2	6.5	7.0	7.6	7.9	8.4	8.6	9.1
0: 5	5	0.1395	7.5105	0.11080	5.8	6.1	6.2	6.7	7.0	7.5	8.1	8.4	9.0	9.2	9.7
0: 6	6	0.1257	7.9340	0.10958	6.1	6.4	6.6	7.1	7.4	7.9	8.5	8.9	9.5	9.7	10.2
0: 7	7	0.1134	8.2970	0.10902	6.4	6.7	6.9	7.4	7.7	8.3	8.9	9.3	9.9	10.2	10.7
0: 8	8	0.1021	8.6151	0.10882	6.7	7.0	7.2	7.7	8.0	8.6	9.3	9.6	10.3	10.5	11.1
0: 9	9	0.0917	8.9014	0.10881	6.9	7.2	7.4	7.9	8.3	8.9	9.6	10.0	10.6	10.9	11.4
0:10	10	0.0820	9.1649	0.10891	7.1	7.5	7.7	8.2	8.5	9.2	9.9	10.3	10.9	11.2	11.8
0:11	11	0.0730	9.4122	0.10906	7.3	7.7	7.9	8.4	8.7	9.4	10.1	10.5	11.2	11.5	12.1
1: 0	12	0.0644	9.6479	0.10925	7.5	7.8	8.1	8.6	9.0	9.6	10.4	10.8	11.5	11.8	12.4
1: 1	13	0.0563	9.8749	0.10949	7.6	8.0	8.2	8.8	9.2	9.9	10.6	11.1	11.8	12.1	12.7
1: 2	14	0.0487	10.0953	0.10976	7.8	8.2	8.4	9.0	9.4	10.1	10.9	11.3	12.1	12.4	13.0
1: 3	15	0.0413	10.3108	0.11007	8.0	8.4	8.6	9.2	9.6	10.3	11.1	11.6	12.3	12.7	13.3
1: 4	16	0.0343	10.5228	0.11041	8.1	8.5	8.8	9.4	9.8	10.5	11.3	11.8	12.6	12.9	13.6
1: 5	17	0.0275	10.7319	0.11079	8.3	8.7	8.9	9.6	10.0	10.7	11.6	12.0	12.9	13.2	13.9
1: 6	18	0.0211	10.9385	0.11119	8.4	8.9	9.1	9.7	10.1	10.9	11.8	12.3	13.1	13.5	14.2
1: 7	19	0.0148	11.1430	0.11164	8.6	9.0	9.3	9.9	10.3	11.1	12.0	12.5	13.4	13.7	14.4
1: 8	20	0.0087	11.3462	0.11211	8.7	9.2	9.4	10.1	10.5	11.3	12.2	12.7	13.6	14.0	14.7
1: 9	21	0.0029	11.5486	0.11261	8.9	9.3	9.6	10.3	10.7	11.5	12.5	13.0	13.9	14.3	15.0
1:10	22	-0.0028	11.7504	0.11314	9.0	9.5	9.8	10.5	10.9	11.8	12.7	13.2	14.2	14.5	15.3
1:11	23	-0.0083	11.9514	0.11369	9.2	9.7	9.9	10.6	11.1	12.0	12.9	13.4	14.4	14.8	15.6
2: 0	24	-0.0137	12.1515	0.11426	9.3	9.8	10.1	10.8	11.3	12.2	13.1	13.7	14.7	15.1	15.9

WHO Child Growth Standards

Weight-for-age BOYS

Birth to 5 years (percentiles)

World Health Organization

					Percentiles (weight in kg)										
Year: Month	Month	L	M	S	1st	3rd	5th	15th	25th	50th	75th	85th	95th	97th	99th
2: 1	25	-0.0189	12.3502	0.11485	9.5	10.0	10.2	11.0	11.4	12.4	13.3	13.9	14.9	15.3	16.1
2: 2	26	-0.0240	12.5466	0.11544	9.6	10.1	10.4	11.1	11.6	12.5	13.6	14.1	15.2	15.6	16.4
2: 3	27	-0.0289	12.7401	0.11604	9.7	10.2	10.5	11.3	11.8	12.7	13.8	14.4	15.4	15.9	16.7
2: 4	28	-0.0337	12.9303	0.11664	9.9	10.4	10.7	11.5	12.0	12.9	14.0	14.6	15.7	16.1	17.0
2: 5	29	-0.0385	13.1169	0.11723	10.0	10.5	10.8	11.6	12.1	13.1	14.2	14.8	15.9	16.4	17.3
2: 6	30	-0.0431	13.3000	0.11781	10.1	10.7	11.0	11.8	12.3	13.3	14.4	15.0	16.2	16.6	17.5
2: 7	31	-0.0476	13.4798	0.11839	10.3	10.8	11.1	11.9	12.4	13.5	14.6	15.2	16.4	16.9	17.8
2: 8	32	-0.0520	13.6567	0.11896	10.4	10.9	11.2	12.1	12.6	13.7	14.8	15.5	16.6	17.1	18.0
2: 9	33	-0.0564	13.8309	0.11953	10.5	11.1	11.4	12.2	12.8	13.8	15.0	15.7	16.9	17.3	18.3
2:10	34	-0.0606	14.0031	0.12008	10.6	11.2	11.5	12.4	12.9	14.0	15.2	15.9	17.1	17.6	18.6
2:11	35	-0.0648	14.1736	0.12062	10.7	11.3	11.6	12.5	13.1	14.2	15.4	16.1	17.3	17.8	18.8
3: 0	36	-0.0689	14.3429	0.12116	10.8	11.4	11.8	12.7	13.2	14.3	15.6	16.3	17.5	18.0	19.1
3: 1	37	-0.0729	14.5113	0.12168	11.0	11.6	11.9	12.8	13.4	14.5	15.8	16.5	17.8	18.3	19.3
3: 2	38	-0.0769	14.6791	0.12220	11.1	11.7	12.0	12.9	13.5	14.7	15.9	16.7	18.0	18.5	19.6
3: 3	39	-0.0808	14.8466	0.12271	11.2	11.8	12.2	13.1	13.7	14.8	16.1	16.9	18.2	18.7	19.8
3: 4	40	-0.0846	15.0140	0.12322	11.3	11.9	12.3	13.2	13.8	15.0	16.3	17.1	18.4	19.0	20.1
3: 5	41	-0.0883	15.1813	0.12373	11.4	12.1	12.4	13.4	14.0	15.2	16.5	17.3	18.6	19.2	20.3
3: 6	42	-0.0920	15.3486	0.12425	11.5	12.2	12.5	13.5	14.1	15.3	16.7	17.5	18.9	19.4	20.6
3: 7	43	-0.0957	15.5158	0.12478	11.7	12.3	12.7	13.6	14.3	15.5	16.9	17.7	19.1	19.7	20.8
3: 8	44	-0.0993	15.6828	0.12531	11.8	12.4	12.8	13.8	14.4	15.7	17.1	17.9	19.3	19.9	21.1
3: 9	45	-0.1028	15.8497	0.12586	11.9	12.5	12.9	13.9	14.6	15.8	17.3	18.1	19.5	20.1	21.3
3:10	46	-0.1063	16.0163	0.12643	12.0	12.7	13.0	14.1	14.7	16.0	17.4	18.3	19.8	20.4	21.6
3:11	47	-0.1097	16.1827	0.12700	12.1	12.8	13.2	14.2	14.9	16.2	17.6	18.5	20.0	20.6	21.9
4: 0	48	-0.1131	16.3489	0.12759	12.2	12.9	13.3	14.3	15.0	16.3	17.8	18.7	20.2	20.9	22.1

WHO Child Growth Standards

Weight-for-age BOYS

Birth to 5 years (percentiles)

World Health Organization

					Percentiles (weight in kg)										
Year: Month	Month	L	M	S	1st	3rd	5th	15th	25th	50th	75th	85th	95th	97th	99th
4: 1	49	-0.1165	16.5150	0.12819	12.3	13.0	13.4	14.5	15.2	16.5	18.0	18.9	20.4	21.1	22.4
4: 2	50	-0.1198	16.6811	0.12880	12.4	13.1	13.5	14.6	15.3	16.7	18.2	19.1	20.7	21.3	22.6
4: 3	51	-0.1230	16.8471	0.12943	12.5	13.3	13.7	14.7	15.4	16.8	18.4	19.3	20.9	21.6	22.9
4: 4	52	-0.1262	17.0132	0.13005	12.6	13.4	13.8	14.9	15.6	17.0	18.6	19.5	21.1	21.8	23.2
4: 5	53	-0.1294	17.1792	0.13069	12.7	13.5	13.9	15.0	15.7	17.2	18.8	19.7	21.4	22.1	23.4
4: 6	54	-0.1325	17.3452	0.13133	12.9	13.6	14.0	15.2	15.9	17.3	19.0	19.9	21.6	22.3	23.7
4: 7	55	-0.1356	17.5111	0.13197	13.0	13.7	14.1	15.3	16.0	17.5	19.2	20.1	21.8	22.5	24.0
4: 8	56	-0.1387	17.6768	0.13261	13.1	13.8	14.3	15.4	16.2	17.7	19.3	20.3	22.1	22.8	24.2
4: 9	57	-0.1417	17.8422	0.13325	13.2	13.9	14.4	15.6	16.3	17.8	19.5	20.5	22.3	23.0	24.5
4:10	58	-0.1447	18.0073	0.13389	13.3	14.1	14.5	15.7	16.5	18.0	19.7	20.7	22.5	23.3	24.8
4:11	59	-0.1477	18.1722	0.13453	13.4	14.2	14.6	15.8	16.6	18.2	19.9	20.9	22.8	23.5	25.0
5: 0	60	-0.1506	18.3366	0.13517	13.5	14.3	14.7	16.0	16.7	18.3	20.1	21.1	23.0	23.8	25.3

WHO Child Growth Standards

Appendix 2: World Health Organization Expected Weight for Age for Children ≤ 5 years (girls)

Weight-for-age GIRLS

Birth to 5 years (percentiles)

World Health Organization

					Percentiles (weight in kg)										
Year: Month	Month	L	M	S	1st	3rd	5th	15th	25th	50th	75th	85th	95th	97th	99th
0: 0	0	0.3809	3.2322	0.14171	2.3	2.4	2.5	2.8	2.9	3.2	3.6	3.7	4.0	4.2	4.4
0: 1	1	0.1714	4.1873	0.13724	3.0	3.2	3.3	3.6	3.8	4.2	4.6	4.8	5.2	5.4	5.7
0: 2	2	0.0962	5.1282	0.13000	3.8	4.0	4.1	4.5	4.7	5.1	5.6	5.9	6.3	6.5	6.9
0: 3	3	0.0402	5.8458	0.12619	4.4	4.6	4.7	5.1	5.4	5.8	6.4	6.7	7.2	7.4	7.8
0: 4	4	-0.0050	6.4237	0.12402	4.8	5.1	5.2	5.6	5.9	6.4	7.0	7.3	7.9	8.1	8.6
0: 5	5	-0.0430	6.8985	0.12274	5.2	5.5	5.6	6.1	6.4	6.9	7.5	7.8	8.4	8.7	9.2
0: 6	6	-0.0756	7.2970	0.12204	5.5	5.8	6.0	6.4	6.7	7.3	7.9	8.3	8.9	9.2	9.7
0: 7	7	-0.1039	7.6422	0.12178	5.8	6.1	6.3	6.7	7.0	7.6	8.3	8.7	9.4	9.6	10.2
0: 8	8	-0.1288	7.9487	0.12181	6.0	6.3	6.5	7.0	7.3	7.9	8.6	9.0	9.7	10.0	10.6
0: 9	9	-0.1507	8.2254	0.12199	6.2	6.6	6.8	7.3	7.6	8.2	8.9	9.3	10.1	10.4	11.0
0:10	10	-0.1700	8.4800	0.12223	6.4	6.8	7.0	7.5	7.8	8.5	9.2	9.6	10.4	10.7	11.3
0:11	11	-0.1872	8.7192	0.12247	6.6	7.0	7.2	7.7	8.0	8.7	9.5	9.9	10.7	11.0	11.7
1: 0	12	-0.2024	8.9481	0.12268	6.8	7.1	7.3	7.9	8.2	8.9	9.7	10.2	11.0	11.3	12.0
1: 1	13	-0.2158	9.1699	0.12283	6.9	7.3	7.5	8.1	8.4	9.2	10.0	10.4	11.3	11.6	12.3
1: 2	14	-0.2278	9.3870	0.12294	7.1	7.5	7.7	8.3	8.6	9.4	10.2	10.7	11.5	11.9	12.6
1: 3	15	-0.2384	9.6008	0.12299	7.3	7.7	7.9	8.5	8.8	9.6	10.4	10.9	11.8	12.2	12.9
1: 4	16	-0.2478	9.8124	0.12303	7.4	7.8	8.1	8.7	9.0	9.8	10.7	11.2	12.1	12.5	13.2
1: 5	17	-0.2562	10.0226	0.12306	7.6	8.0	8.2	8.8	9.2	10.0	10.9	11.4	12.3	12.7	13.5
1: 6	18	-0.2637	10.2315	0.12309	7.8	8.2	8.4	9.0	9.4	10.2	11.1	11.6	12.6	13.0	13.8
1: 7	19	-0.2703	10.4393	0.12315	7.9	8.3	8.6	9.2	9.6	10.4	11.4	11.9	12.9	13.3	14.1
1: 8	20	-0.2762	10.6464	0.12323	8.1	8.5	8.7	9.4	9.8	10.6	11.6	12.1	13.1	13.5	14.4
1: 9	21	-0.2815	10.8534	0.12335	8.2	8.7	8.9	9.6	10.0	10.9	11.8	12.4	13.4	13.8	14.6
1:10	22	-0.2862	11.0608	0.12350	8.4	8.8	9.1	9.8	10.2	11.1	12.0	12.6	13.6	14.1	14.9
1:11	23	-0.2903	11.2688	0.12369	8.5	9.0	9.2	9.9	10.4	11.3	12.3	12.8	13.9	14.3	15.2
2: 0	24	-0.2941	11.4775	0.12390	8.7	9.2	9.4	10.1	10.6	11.5	12.5	13.1	14.2	14.6	15.5

WHO Child Growth Standards

Weight-for-age GIRLS

Birth to 5 years (percentiles)

World Health Organization

					Percentiles (weight in kg)										
Year: Month	Month	L	M	S	1st	3rd	5th	15th	25th	50th	75th	85th	95th	97th	99th
2: 1	25	-0.2975	11.6864	0.12414	8.9	9.3	9.6	10.3	10.8	11.7	12.7	13.3	14.4	14.9	15.8
2: 2	26	-0.3005	11.8947	0.12441	9.0	9.5	9.8	10.5	10.9	11.9	12.9	13.6	14.7	15.2	16.1
2: 3	27	-0.3032	12.1015	0.12472	9.2	9.6	9.9	10.7	11.1	12.1	13.2	13.8	15.0	15.4	16.4
2: 4	28	-0.3057	12.3059	0.12506	9.3	9.8	10.1	10.8	11.3	12.3	13.4	14.0	15.2	15.7	16.7
2: 5	29	-0.3080	12.5073	0.12545	9.5	10.0	10.2	11.0	11.5	12.5	13.6	14.3	15.5	16.0	17.0
2: 6	30	-0.3101	12.7055	0.12587	9.6	10.1	10.4	11.2	11.7	12.7	13.8	14.5	15.7	16.2	17.3
2: 7	31	-0.3120	12.9006	0.12633	9.7	10.3	10.5	11.3	11.9	12.9	14.1	14.7	16.0	16.5	17.6
2: 8	32	-0.3138	13.0930	0.12683	9.9	10.4	10.7	11.5	12.0	13.1	14.3	15.0	16.2	16.8	17.8
2: 9	33	-0.3155	13.2837	0.12737	10.0	10.5	10.8	11.7	12.2	13.3	14.5	15.2	16.5	17.0	18.1
2:10	34	-0.3171	13.4731	0.12794	10.1	10.7	11.0	11.8	12.4	13.5	14.7	15.4	16.8	17.3	18.4
2:11	35	-0.3186	13.6618	0.12855	10.3	10.8	11.1	12.0	12.5	13.7	14.9	15.7	17.0	17.6	18.7
3: 0	36	-0.3201	13.8503	0.12919	10.4	11.0	11.3	12.1	12.7	13.9	15.1	15.9	17.3	17.8	19.0
3: 1	37	-0.3216	14.0385	0.12988	10.5	11.1	11.4	12.3	12.9	14.0	15.3	16.1	17.5	18.1	19.3
3: 2	38	-0.3230	14.2265	0.13059	10.6	11.2	11.6	12.5	13.0	14.2	15.6	16.3	17.8	18.4	19.6
3: 3	39	-0.3243	14.4140	0.13135	10.8	11.4	11.7	12.6	13.2	14.4	15.8	16.6	18.0	18.6	19.9
3: 4	40	-0.3257	14.6010	0.13213	10.9	11.5	11.8	12.8	13.4	14.6	16.0	16.8	18.3	18.9	20.2
3: 5	41	-0.3270	14.7873	0.13293	11.0	11.6	12.0	12.9	13.5	14.8	16.2	17.0	18.6	19.2	20.5
3: 6	42	-0.3283	14.9727	0.13376	11.1	11.8	12.1	13.1	13.7	15.0	16.4	17.3	18.8	19.5	20.8
3: 7	43	-0.3296	15.1573	0.13460	11.3	11.9	12.2	13.2	13.9	15.2	16.6	17.5	19.1	19.7	21.1
3: 8	44	-0.3309	15.3410	0.13545	11.4	12.0	12.4	13.4	14.0	15.3	16.8	17.7	19.3	20.0	21.4
3: 9	45	-0.3322	15.5240	0.13630	11.5	12.1	12.5	13.5	14.2	15.5	17.0	17.9	19.6	20.3	21.7
3:10	46	-0.3335	15.7064	0.13716	11.6	12.3	12.6	13.7	14.3	15.7	17.3	18.2	19.9	20.6	22.0
3:11	47	-0.3348	15.8882	0.13800	11.7	12.4	12.8	13.8	14.5	15.9	17.5	18.4	20.1	20.8	22.3
4: 0	48	-0.3361	16.0697	0.13884	11.8	12.5	12.9	14.0	14.7	16.1	17.7	18.6	20.4	21.1	22.6

WHO Child Growth Standards

Weight-for-age GIRLS

Birth to 5 years (percentiles)

World Health Organization

					Percentiles (weight in kg)										
Year: Month	Month	L	M	S	1st	3rd	5th	15th	25th	50th	75th	85th	95th	97th	99th
4: 1	49	-0.3374	16.2511	0.13968	11.9	12.6	13.0	14.1	14.8	16.3	17.9	18.9	20.6	21.4	22.9
4: 2	50	-0.3387	16.4322	0.14051	12.1	12.8	13.2	14.3	15.0	16.4	18.1	19.1	20.9	21.7	23.2
4: 3	51	-0.3400	16.6133	0.14132	12.2	12.9	13.3	14.4	15.1	16.6	18.3	19.3	21.2	22.0	23.5
4: 4	52	-0.3414	16.7942	0.14213	12.3	13.0	13.4	14.5	15.3	16.8	18.5	19.5	21.4	22.2	23.9
4: 5	53	-0.3427	16.9748	0.14293	12.4	13.1	13.5	14.7	15.4	17.0	18.7	19.8	21.7	22.5	24.2
4: 6	54	-0.3440	17.1551	0.14371	12.5	13.2	13.7	14.8	15.6	17.2	18.9	20.0	22.0	22.8	24.5
4: 7	55	-0.3453	17.3347	0.14448	12.6	13.4	13.8	15.0	15.8	17.3	19.1	20.2	22.2	23.1	24.8
4: 8	56	-0.3466	17.5136	0.14525	12.7	13.5	13.9	15.1	15.9	17.5	19.3	20.4	22.5	23.3	25.1
4: 9	57	-0.3479	17.6916	0.14600	12.8	13.6	14.0	15.3	16.1	17.7	19.6	20.7	22.7	23.6	25.4
4:10	58	-0.3492	17.8686	0.14675	12.9	13.7	14.2	15.4	16.2	17.9	19.8	20.9	23.0	23.9	25.7
4:11	59	-0.3505	18.0445	0.14748	13.1	13.8	14.3	15.5	16.4	18.0	20.0	21.1	23.3	24.2	26.0
5: 0	60	-0.3518	18.2193	0.14821	13.2	14.0	14.4	15.7	16.5	18.2	20.2	21.3	23.5	24.4	26.3

WHO Child Growth Standards