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Failure To Thrive In Children Under Three Years Of Age And Associated Factors, cross-sectional research Study

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ABSTRACT

Background: Inadequate nutrition or chronic diseases are typical causes of failure to thrive in infants and young children.

Patients and Methods: One hundred children less than three years old with FTT who were hospitalised to the general hospital in Diyala province, Iraq between September 2020 and September 2022 were analysed in this cross-sectional research. Children's growth was evaluated by measuring their weight, height, and head circumference at age-appropriate intervals and calculating their Z-scores (Standard deviation scores) and means using the Tanner growth charts. Haemoglobin levels and children's socioeconomic status were also examined.

Results: There were 1.5 males for every female, and 76% of the kids were infants; 50% were from low-income homes with many members living in close quarters. Fifty-two mothers (52%) were found to be illiterate. There were 46 (or 46%) kids that were bottle-fed only. Many of these kids are severely undernourished: 44 (44%), whose weights for age were -3SD below the mean; 24 (14%), whose heights were -3SD; and 14 (14%), whose head circumference was -3SD. The majority of the youngsters in this research came from big, low-income homes.

Conclusion: we can safely say that failure to flourish is endemic here. Seventy-six percent were infants The purpose of this study is to evaluate the prevalence and causes of failure to thrive and half came from low-income families.

Keywords: *children, failure to thrive, socioeconomic, infant and toddlers, approach*

INTRODUCTION

When a child's weight falls below the 5th percentile, doctors commonly call it "failure to thrive" (FTT).to sex; to age; although its precise meaning remains a matter of heated debate. Weight for length below the 5th percentile, body mass index below the 5th percentile, or a sustained drop in growth velocity, where weight for age or weight for length/height decreases by two major percentiles (percentile markers 95th, 90th, 75th, 50th, 25th, 10th, and 5th) over time are all examples of what are considered to be indicators of stunted growth [1-6]. While it most commonly affects kids aged 1-2, it can manifest at any moment [4].

The most noticeable symptom of FTT is a failure to gain or maintain an adequate amount of weight; however, chronic severe malnutrition has a negative impact on overall growth, affecting weight, head length, circumference, and, in extreme cases, can compromise the development of cognitive abilities and appropriate immune function, leading to a delay in reaching developmental milestones and normal health [6].A broad variety of physical disorders, as well as biological variables like parental height and weight, socioeconomic ones like poverty, maternal education level, and family size, and many more have all been linked to the disorder. The leading cause of FTT is malnutrition or insufficient caloric intake.

Asymptomatic and physically sound infants have a low risk of having organic FTT [3, 7].When children appear with symptoms of disease or for routine checkups, the family physician is in the best position to identify FTT.In order to confirm a diagnosis of non-organic FTT (NOFTT), primary care providers can keep track of the child's diet for 1-2 weeks and look for signs of continuous weight growth. Investigations should be undertaken in the presence of signs or symptoms of the condition or if weight loss is chronic or severe [6]. There is currently no evidence to support the broad, systematic use of screening laboratory examinations in FTT. Except in extremely rare cases, in-patient monitoring is not recommended. Extreme parental impairment or anxiety; extremely poor parent-child interaction; the need for precise documentation of nutritional intake; psychosocial factors that put the child's safety at risk; an underlying severe illness or medical problem; severe malnutrition or dehydration; or severe weight faltering (a drop of two or more percent) are the only circumstances under which infants should be referred to a secondary care paediatrician [6, 8].By performing and analysing laboratory tests, radiological imaging, and expert consultations quickly and effectively, hospitalisation helps doctors rule out the presence of an underlying organic condition.If a protracted satiety phase is anticipated, some patients with severe inanition may benefit from nutritional supplements by nasogastric tube feeding or gastrostomy feeding [9].Previous literature [10] presented a semi-objective diagnostic instrument for determining which individuals may gain from additional examination and treatments to maximise growth and development.

Failure To Thrive: What It Means

Multiple criteria have been presented for the diagnosis of FTT at the present time (Table 1). All definitions of FTT, however, call for kids to be placed on a normal-for-age development chart. Specifically, a growth chart from the World Health Organisation (WHO) should be used for children younger than 2 years of age, whereas a CDC chart should be used for children aged 2 years and above in the United States.

Table 1's criteria are neither sensitive or specific enough to identify all infants with FTT, as demonstrated by Olsen et al.3. Multiple variables must be addressed when making a diagnosis of FTT since there are various ways in which a kid might appear to have FTT while really developing normally. Many children who are born above the 95th percentile for their age at conception will fall down the percentile rankings after delivery. Children who are born short for their gestational age have a 13% chance of never catching up in height, and 25% chance of falling more than 2 major percentile lines4.5 A child's genetic potential for height is reduced if both of his or her parents are short, and the prevalence of short stature in a family increases if there is a history of constitutional development delay. Furthermore, some typically developing youngsters will inevitably fall below the major tenth percentile for their age. Once undernourishment begins to impair a kid's height, it may not be immediately apparent, and the youngster may appear to have a normal body mass index (BMI), weight, or length. Therefore, anthropometric z-scores (Table 2) are the gold standard for diagnosing stunted development and malnutrition.Z-scores of 6.7 standard deviations provide for a more nuanced description of stunted growth, especially near the curve's outliers. A z-score of -1.89 corresponds to the 3rd percentile and a z-score of 0 represents the 50th percentile. Third-percentile is the most precise description of a child that can be made using a percentile chart. When comparing children at nutritional risk, percentiles do not distinguish between those with a z-score of -2.5 and those with a z-score of -3.5. Better tracking of growth changes is possible with z-scores (for instance, if an improvement in z-score from -3.5 to -3 would not be seen using percentile criteria). For a kid whose

development curve is plateauing and for whose deceleration of z-scores is relevant, absolute z-scores cannot be utilised, just as percentiles cannot. There are online Z-score calculators available for both the WHO and CDC charts.The Top 8 Reasons People Succumb

Conventional wisdom divides the causes of FTT into two camps, organic and inorganic. Nonorganic aetiologies of FTT improve with behavioural treatments, but organic aetiologies are reversible by treatment of the underlying condition. Nonorganic causes account for as much as 86 percent of all FTT in children admitted to hospitals, and this number is probably greater in the community.9 More recently, it has been questioned whether or not FTT can be truly dichotomized into organic and inorganic aetiologies. Behavioural considerations are common even with organic FTT. In particular, the potential that environmental variables are also contributing to a child's poor growth cannot be ruled out by organic pathology. A child's stunted development is often the result of a number of different circumstances, both organic and inorganic.6,10-12 This means that insufficient caloric intake, poor caloric absorption, or excessive caloric expenditure can all play a role in the development of FTT (Table 3).

Solutions For The Slow-Growing Patient

A thorough history and physical examination is essential for diagnosing FTT and elucidating an aetiology. If you suspect an underlying organic ailment is to blame for your child's FTT, you'll need to have a full picture of their eating history. Preparation of formula, duration and frequency of feeding and meals, feeding setting, and indicators of difficulty with eating, such as coughing or choking, are all crucial factors to examine when analysing a patient's feeding history. The child's diet must be analysed for both quantity and quality, with special emphasis paid to juice, soda, milk, and water. The most effective methods for doing this are the 24-hour food recall and the 3-day food diary.

Chronic conditions, a history of recurrent infections, and developmental delay are all crucial to learn about in a person's medical history. A parental history of constitutional growth delay is a significant element in the family history. A kid with constitutional growth delay will typically have low weights, lengths, and OFCs after roughly 6 months of age, but a child with FTT will typically lose weight before they lose height or head circumference. If you want to know if your child is on track to attain their genetic potential, you need to know their mid-parental height. By using the following formula, a child's adult height should be within 8.5 centimetres of their parents' mid-parental height: (Maternal Height [in cm] + Paternal Height [in cm] [+5 cm if male; -5 cm if female] / 2). Consider who feeds the kid, where the youngster eats, and if there are any barriers to food availability while compiling the child's social history. The physical examination of a patient with FTT must include precise anthropometric measures. Children under the age of two years old should be weighed either without clothes on or while wearing a clean, dry nappy. Weight should be taken with the kid wearing light clothing and without shoes if they are 2 years of age or older. Children under the age of two should have their length measured using a length board, while those aged two and over should have it measured with a stadiometer. The evaluation of a kid with FTT should include more than just anthropometric measurements; the physician should also look for indicators of organic illness and neglect during a thorough physical examination.

Evaluation

The cause of FTT is seldom discovered via evaluation using laboratory testing, imaging, or endoscopy. Despite the fact that all possible aetiologies might be deduced from the patient's history and physical, research has revealed that only 0.8%-1.4% of tests result in an organic aetiology of FTT.9,13 Therefore, behavioural interventions and increased caloric intake should be the main line of treatment in controlling FTT, unless there are startling results based on history and examination that suggest an organic aetiology.

There has to be more testing done if dietary and behavioural interventions don't work. Complete blood count, electrolytes, blood urea nitrogen, albumin, celiac screening if exposed to gluten (anti-transglutaminase immunoglobulin A and immunoglobulin A level), and erythrocyte sedimentation rate are all possible laboratory studies to consider. For recurrent vomiting (beyond typical infant reflux) an upper

gastrointestinal fluoroscopy series may be considered to evaluate for malrotation, along with a head image, echocardiography, and chest X-ray. If the patient's physical examination points to a genetic cause, further testing may be required.

Interventions

Behavioural interventions and enhanced caloric availability are used to optimise growth, including catch-up growth, in a child with FTT (Table 4). Most behavioural therapies are adapted from research on food disorders. Meals should be served in an age- and developmentally-appropriate setting, such as a high chair or a table. A child's eating schedule should include regular, age-appropriate meals and snacks. Infants should be fed at least every three hours, while toddlers and school-aged children should eat three square meals and two snacks daily. Children should not be permitted to "graze" throughout the day and mealtimes should be limited to no more than 20 to 30 minutes. To promote hunger throughout mealtimes, only water should be offered between meals and snacks. Since juice has been demonstrated to contribute to FTT despite its low calorie content (only 15 kcal/oz), it should not be administered along with other sweetened liquids.14 Prevention

Some occurrences of FTT may be avoided with regular well-child visits that include dietary counselling and preventative recommendations. Families of children at high risk of developing FTT may benefit from having dietitians or visiting nurses give emotional and educational assistance.

TABLE 3.

Failure to Thrive Defined by Malnutrition Z-Scores

Anthropometric Measurements	Mild Malnutrition	Moderate Malnutrition	Severe Malnutrition
Weight-for-height/BMI z-score	-1 to -1.9	-2 to -2.9	≤ -3
Length/height z-score	-	-	≤ -3
Mid-upper arm circumference z-score	-1 to -1.9	-2 to -2.9	≤ -3
Weight gain velocity[a] (<2 years)	<75% expected	<50% expected	<25% expected
Weight loss (≥2 years)	5% body weight	7.5% body weight	10% body weight
Deceleration of weight-for-length z-score	-1 z-score	-2 z-scores	-3 z-scores

Abbreviation: BMI, body mass index.
[a]Based on World Health Organization data.[15]
Adapted from a consensus statement from the American Society for Parenteral and Enteral Nutrition.[7]

TABLE 1.

Etiologies of Failure to Thrive

Inadequate intake
- Lack of food availability
- Neglect
- Difficulties with breast-feeding
- Improper formula preparation
- Cleft lip and or palate
- Developmental delay
- Eating disorder

Inadequate absorption
- Celiac disease
- Pancreatic insufficiency
- Inflammatory bowel disease
- Eosinophilic esophagitis or gastroenteritis/food allergy
- Cow's milk enterocolitis
- Congenital diarrhea

Increased caloric expenditure
- Congenital heart disease
- Renal disease (eg, renal tubular acidosis)
- Chronic pulmonary disease (eg, cystic fibrosis)
- Laryngomalacia
- Malignancy
- Immunodeficiency
- Thyroid disease

Table 3. Red Flag Signs and Symptoms Suggesting Medical Causes of Failure to Thrive

- Cardiac findings suggesting congenital heart disease or heart failure (e.g., murmur, edema, jugular venous distention)
- Developmental delay
- Dysmorphic features
- Failure to gain weight despite adequate caloric intake
- Organomegaly or lymphadenopathy
- Recurrent or severe respiratory, mucocutaneous, or urinary infection
- Recurrent vomiting, diarrhea, or dehydration

Table 2. Differential Diagnosis of Failure to Thrive

Inadequate caloric intake	*Inadequate caloric absorption*	*Excessive caloric expenditure*
Infant or toddler		
Breastfeeding problem	Food allergy	Thyroid disease
Improper formula preparation	Malabsorption	Chronic infection or immunodeficiency
Gastroesophageal reflux	Pyloric stenosis	Chronic pulmonary disease
Caregiver depression	Gastrointestinal atresia or malformation	Congenital heart disease or heart failure
Lack of food availability	Inborn error of metabolism	Malignancy
Cleft lip or palate		
Child or adolescent		
Mood disorder	Food allergy	Thyroid disease
Eating disorder	Celiac disease	Chronic infection or immunodeficiency
Gastroesophageal reflux	Malabsorption	Chronic pulmonary disease
Irritable bowel syndrome	Inflammatory bowel disease	Congenital heart disease or heart failure
	Inborn error of metabolism	Malignancy

PATIENTS AND METHODS

Admitted children were included in this descriptive, cross-sectional research. One hundred children less than three years old hospitalised to the general hospital in Diyala province, Iraq, for malnutrition and a weight below the 3rd percentile between September 2020 and September 2022 were included in this study. The mothers who cared for their children gave detailed accounts of their children's backgrounds, including their ages, genders,

places of residence, illnesses prior to admission, parents' educational backgrounds, occupations, incomes, and the number of people living in their homes (the "crowding index"; crowding index = number of people / number of rooms). Pallor, wasting, and edoema are all part of the clinical examination for nutritional evaluation, as are weight, height, and head circumference, all of which are measured using a growth and developmental chart (created by J.M. Tanner and R.H.whitehouse).Z-score (standard deviation) plots were made for body mass index, stature, and skull size. Z-score or SD score = observed value minus reference median divided by standard deviation of reference population.When a person's weight-for-age and height-for-age scores are two standard deviations below the mean, we say that their nutrition is subpar. Children with a z-score of less than -3 are very malnourished, whereas a z-score of -2 is deemed normal.

Statistical analysis

The information was cleaned and analysed by SPSS (SPSS Inc., Chicago, IL, USA) version 21. Percentages and frequency counts were used to illustrate the outcomes. The 95% confidence interval was based on a p-value of less than 0.05, the threshold for statistical significance.

RESULTS

One hundred kids were studied using FTT, and their demographics were listed in Table 1. There were 1.5 males for every female, and about half of the population was infantile. There are 52% more children whose moms are uneducated. In households with three or more people, 60% of the dwelling space was occupied. The majority of the newborns in the study had body weights, heights, and head circumferences that were two to three standard deviations (SDs) below the mean, as seen in Table 2 below.76% of the newborns tested had hemoglobin(Hb) levels below 11gm/dL, whereas only 8% of the children had Hb levels 6gm/dL, and 40% of the infants affected by FTT have nonorganic reasons.

TABLE 1A: Sociodemographic of gender child with F.T.T

Gender	no. of childern	percent%	p value
Male	60	60%	0.155
Female	40	40%	0.155
Total	100	100%	

TABLE(1.B): Sociodemographic-age of child with F.T.T .

Age (months)	Male	Female	no. of childern	Percent %	p value
<6	28	20	48	48%	0.001
7.12	18	10	28	28%	
12.24	12	8	20	20%	
24.36	2	2	4	4%	
Total			10	100%	

TABLE(1.C): Sociodemographic -type of feeding child with F.T.T .

Types of feeding	Exclusive breast feeding	8	8%	0.001
	Partially breast feeding	8	8%	
	breast feeding+coplementary food	16	16%	
	Exclusive bootle feeding	46	46%	
	bootle feeding+coplementary food	14	14%	
	solid food	8	8%	
	Total	100	100%	

TABLE(1.D): Sociodemographic .crowding of child with F.T.T .

Crowding index	1.3	30	30%	0.001
	3.5	60	%60	
	>5	10	10%	
	Total	100	100%	

TABLE(1.E): Sociodemographic .Socioecomic of child with F.T.T .

Socioeconomic status	poor	50	50%	0.001
	medium	44	44%	
	Good	6	6%	
	Total	100	100%	

TABLE(1.F): Sociodemographic mother eduction of child with F.T.T .

Mother education	Illiterate	52	52%	0.001
	primary school	30	30%	
	intermediate school	12	1 2%	
	high school	6	6%	
	Total		100%	

TABLE(2.A): The characteristic - Weight/age child with F.T.T .

	Stander Deviation below the mean	number of child	percent%	p value
Weight/age	-2SD	4	4%	0.001
	<-(2 -3)SD	52	52%	0.001
	<-3	44	44%	0.001
	Total	100	100%	

TABLE(2.A): The characteristic - height/age child with F.T.T .

	Stander Deviation below the mean	number of child	percent%	p value
Height/age	-2SD	16	16%	0.000
	<-(2 -3)SD	60	60%	0.000
	<-3	24	24%	0.000
	Total	100	100%	

TABLE (2.A): The characteristic - OFC/age child with F.T.T .

	Stander Deviation below the mean	number of child	percent%	p value
Head circumference (OFC)/age	Normal(OFC)	32	32%	0.001
	>+ 2 SD	4	4%	0.001
	<-(2 -3)SD	50	50%	0.001
	<-3	14	14%	
	Total	100	100%	

TABLE 3: The causes of underlying F.T.T

causes	number of child	percent%	p value
A.Under nutrition (defective intake)	40	40%	0.155
B.Organic causes	60	60%	
1.cardiovascular system			
VSD and H.F(heart failure)	14	14%	
2.CNS system			
Cerrebral Palsy and M.R(mental retardatian)	4	4%	
3.Renal system			
U.T.I	10	10%	
Post urethral valve	4	4%	
4.Metabolic system			
Galactosemia	2	2%	
Gaucher ´s disease	4	4%	
5.Infections congenital immune deficiency	4	4%	
6.Endocrine system			
Hypothyroidism	2	2%	
7.GIT			
Cow´s milk intolerance	6	6%	
Lactose intolerance	4	4%	
pyloric stenosis	4	4%	
Celiac disease	2	2%	
Cholestatic jaundice	4	4%	
Cleft lip and palate	2	2%	
Total	100	100%	

DISCUSSION

Male gender was associated with a higher risk of failing to succeed in our community.more prevalent than female, although statistically insignificant,which was in agreement with other studies[3,6,25], but different from study done in Denmark where females were more commonly affected than males [20], since male gender is a risk factor for many diseases and also due to different sampling technique. Thirty-eight patients (76%) were younger than one year old. This agrees with similar research [20,25]. Failure to provide adequate nutrition during this time due to low socioeconomic level where they lived is likely to have a diverse effect on development and growth, as seen in other studies [14,15, 20,23]. This may be due to rapid rates of growth-in infants, accompanied by marked developmental changes in organ function and composition. Weight, height, and head circumference are the primary indicators of growth in children. Edematous, severely wasted, or severely stunted status, as defined by WHO standards [14,15,23], was used to identify the severity of malnutrition. The weight-for-age of 44% of our patients was -3SD below the mean, indicating severe malnutrition; the height-for-age of 24% of our patients was less than - 3SD below the mean, indicating severe stunting. Stunt children are at risk for rapid deterioration of their condition due to the advent of comorbidities such as diarrhoea, respiratory illness, or measles, despite being diagnosed with a milder, chronic type of malnutrition. Eighty percent of the children admitted were from Jalawla; this high number may be related to the fact that many of the kids who are brought to the hospital have a history of foetal alcohol spectrum disorder (FASD) in addition to other health issues. The education of mothers is crucial to the success of their families. Our 52% illiteracy rate is lower than that of previous studies by around 10%. Their socioeconomic status is likely different from ours [15,19,25] since their research was conducted in urban slums. Patients'

socioeconomic level was often low. Because of insufficient food intake and low food quality, this issue has a significant impact on children's nutritional status. The majority of the children in the study lived in homes with a crowding index of >3-5, which is indicative of poor socioeconomic position and raises the probability of repeated infections.Consistent with the results of Kashi et al. Twenty-three (46.6%) of the children were only bottlefed, which contradicts the findings of prior research [5,11]. This may be associated with the fact that breast-feeding is more challenging to establish for mothers due to mental stressors and overall community status, leading to a higher likelihood of bottle-feeding and an increase in the recurrence of gastroenteritis and other infectious disorders. This will cause stunting and food insecurity. Eighty-four percent of the children in the study had anaemia, and a closer look at their haemoglobin levels and blood films revealed that the majority of these kids had hypochromic microcytic anaemia, which is strongly indicative of iron deficiency. Since most of the children in the studies come from low-income families, this could be due to dietary deficiencies in iron, protein, and other elements, as well as the fact that biologically available iron and protein are found in animal sources of foods that are relatively expensive for the families to afford to give to the child.Infants with IDA have been shown to have decreased appetite, increased irritability, and decreased interest in their surroundings [2, 4.6, 8, 14]. Fortunately, both total blood protein and serum albumin levels are within acceptable limits in all individuals tested.While 40 patients (40%) had FTT due to nonorganic causes, the remaining 60 patients (60%) had FTT due to organic causes of various systemic disorders, most notably GIT and renal diseases, which is greater than the 46% of patients who had organic causes identified in the research by Olsen et al. [20]. There may be overlap between organic and non-organic failure to thrive due to the presence of mild illnesses, vomiting, diarrhoea, and behavioural disorder, even if the nonorganic reasons were most prevalent. Thus, some scholars argue for the inclusion of a third "mixed" aetiology category.

CONCLUSIONS

Male preponderance and widespread poverty and illiteracy among mothers are to blame for the epidemic of undernourishment that plagues our community.

RECOMMENDATIONS

Based on our research, we suggest the following: One, raise the moms' educational levels.

Two, if possible, push for full-time breastfeeding for the first six months. Third, since we found IDA to be widespread among the kids we looked at, we think every kid under a year old should take an iron supplement every day.

REFERENCES

1. Huh SY, Duggan CP. : A 19-Month-Old Girl with Failure to Thrive. N Engl J Med. 2018 , 15;378 (7):685-6.
2. Perrin E, Frank D, Cole C, Deborah A., Stephan R., Nicholas Guerina, et al. Criteria for Determining Disability in Infants and Children: Failure to Thrive. Evidence Report/ Technology Assessment No. 72. AHRQ Publication NO. 03-E026. Agency for Healthcare Research and Quality, Rockville, MD, March 2003.
3. Corbett SS, Drewett RF: To what extent is failure to thrive in infancy associated with poorer cognitive development? A review and meta-analysis. J Child Psychol Psychiatry. 2004 ;45(3):641-54.
4. Goh LH, How CH, Ng KH: Failure to thrive in babies and toddlers. Singapore Med J. 2016 Jun;57(6):287-91. doi: 10.1162.
5. Olsen EM, Petersen J, Skovgaard AM. B Weile, T Jørgensen, and C M Wright :Failure to thrive: the prevalence and concurrence of anthropometric criteria in a general infant population. Arch Dis Child 2007; 92:109.
6. Spencer NJ. : Failure to think about failure to thrive. Arch Dis Child 2007; 92:95.
7. Hughes I.. : Confusing terminology attempts to define the undefinable. Arch Dis Child 2007; 92:97.
8. Casey PH. Failure to thrive. In: Developmental-Behavioral Pediatrics, 4th ed, Carey WB, Crocker AC, Coleman WL, et al (Eds), Saunders Elsevier, Philadelphia 2009. p.583.
9. A Emond, R Drewett , P Blair, P Emmett: Postnatal factors associated with failure to thrive in term infants in the Avon Longitudinal Study of Parents and Children, Arch Dis Child 2007;92:115–119..2005.091496. doi: 10.1136/adc.
10. Larson-Nath C, Biank VF.: Clinical Review of Failure to Thrive in Pediatric Patients; Pediatr Ann. 2016 ;45(2): 46-9. doi: 10.3928/00904481.
11. Failure To Thrive In Children Under Two Years Of Age And Associated Factors, A Hospital-

Based Study Hassan M Khalil (DCH)1 , Sundus M.Husain (FICMS)2 , Maghreb S Alkhateeb (DCH)3 and Jalil I Alezzi (FICMS)4, DOI:https://doi.org/10.26505/DJM.170247707013.

12. Failure to thrive in infant and toddlers: a practical flowchart-based approach in a hospital setting Roberto Franceschi1* , Caterina Rizzardi1, Evelina Maines1, Alice Liguori1, Massimo Soffiati1 and Gianluca Tornese2.
13. Clinical Review of Failure to Thrive in Pediatric Patients Catherine Larson-Nath, MD; and Vincent F. Biank, MD, MS.
14. An approach to 'failure to thrive' 3Reprinted from Australian Family Physician Vol. 34, No. 9, September 2005.
15. Failure to Thrive: An Update,SARAH Z. COLE, DO, Mercy Family Medicine Residency, St. John's Mercy Medical Center, St. Louis, Missouri-JASON S. LANHAM, MAJ, MC, USA, Eisenhower Army Medical Center, Ft. Gordon, Georgia.
16. Gahagen S. Failure to thrive: a consequence of undernutrition. *Pediatr Rev*. 2006;27(1):e1-e11.
17. Levy Y, Levy A, Zangen T, et al. Diagnostic clues for identification of nonorganic vs organic causes of food refusal and poor feeding. *J Pediatr Gastroenterol Nutr*. 2009;48(3):355-362.
18. Panetta F, Magazzù D, Sferlazzas C, Lombardo M, Magazzù G, Lucanto MC. Diagnosis on a positive fashion of nonorganic failure to thrive. *Acta Paediatr*. 2008;97(9):1281-1284.
19. Olsen EM, Petersen J, Skovgaard AM, Weile B, Jørgensen T, Wright CM. Failure to thrive: the prevalence and concurrence of anthropometric criteria in a general infant population. *Arch Dis Child*. 2007;92(2):109-114.
20. Failure to thrive. Criteria for determining disability in infants and children summary. Evidence report/technology assessment: number 72. AHRQ publication no. 03-E019. Rockville, Md.: Agency for Healthcare Research and Quality; March 2003. http://www.ahrq.gov/clinic/epcsums/fthrivesum.htm. Accessed January 6, 2010.
21. de Onis M, Garza C, Onyango AW, Borghi E. Comparison of the WHO child growth standards and the CDC 2000 growth charts. *J Nutr*. 2007;137(1):144-148.
22. National Institute for Health and Care Excellence. Faltering growth: Recognition and management of faltering growth in children. NICE guideline (NG75). September2017. Available at:https://www.nice.org.uk/guidance/ng75 (Accessed on July 22, 2018).
23. McDougall P , Drewett RF, Hungin AP, Wright CM.; The detection of early weight faltering at the 6-8-week check and its association with family factors, feeding and behavioural development.: Arch Dis Child. 2009 Jul;94(7):549-52. doi:10.1136/adc.2008.139063.
24. Olsen EM , Johannsen TH, Moltesen B, Skovgaard AM 2002, Failure to thrive among hospitalized 0-2 year-old children, Ugeskr Laeger. 2002 Nov 25;164(48):5654-
25. Cardona Cano S, Hoek HW, Bryant- Waugh R. Picky eating: the current state of research. Curr Opin Psychiatry 2015; 28:448.
26. Levy Y, Levy A, Zangen T, Kornfeld L, Dalal I, Samuel E, et al. :Diagnostic clues for identification of nonorganic vs organic causes of food refusal and poor feeding. J Pediatr Gastroenterol Nutr, 2009; 48:355.
27. Alvares M, Kao L, Mittal V, Misdiagnosed food allergy resulting in severe malnutrition in an infant. Pediatrics 2013;