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Failure to thrive and it's Risk factors among children under 5 years old in Al-Batool Teaching Hospital in Baquba city

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Abstract

Background: Failure to thrive (FTT) indicates insufficient weight gain or absence of an appropriate physical growth,it is a sign not a disease ,commonly seen by the primary health care physicians. It might be due to organic or non-organic causes and it is usually of a multifactorial etiology.

Objective: To detect the prevalence of failure to thrive and risk factors in pediatric age group - under 5 year old in Al-Batool teaching hospital in Baquba city through 2020-2021.

Patients and Methods: This study was across sectional study that took place In Al-Batool Teaching Hospital for maternity and children,in Baquba Distract-Diyala province, Iraq.during the period from 1st of February 2020-31st of July 2021. Throughout this study Two hundred and fifty (250) child were randomly selected under -5years old . Informations were collected from the patients files including age,current weight,birth weight,type of feeding,weaning,history of prematurity, history of chronic diseases and socioeconomic conditions.

Results: Showed that children below 12 months were (45.2%), males (51.6%)and females (48.4%). male:female ratio was 1:1 ,majority of children were from Bohris . medium socioeconomic level was the largest with (61.6%). regarding mother education,mothers who have secondary education represent the largest level with (45.6%),children with bottle feeding were the largest with (45.0%),premature birth represent (2.0%),children with chronic diseases (14.0%),children with UTI (32.0%). Children with (FTT)were(23.2%),while (76.8%) were of normal growth. Regarding age groups most of the affected children were below 24 months of age with (36.5%) (P value was 0.0001) which is considered to be a significant. Males with (FTT) (24.8%) ,while Females (21.5%). (Pvaluewas0.534) which is considered to be of no significance. Regarding children with (FTT) and low socioeconomic level it was (68.8%) (p value was 0.0001)which is considered to be a significant. Children with (FTT) and illutrate mother was(60.0%) (p value was 0.0001)which is considered to be a significant. children with breastfeeding showed no (FTT) ,while those with bottle feeding was (37.0%) (P value was 0.0001) which is considered to be a significant. children with (FTT) and UTI (58.8%)(P value was 0.0001)which is considered to be a significant.

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Conclusion: This study concluded that failure to thrive is strongly correlated with poverty, mothers education ,chronic diseases, premature birth and type of feeding.failure to thrive showed no correlation with gender .

Keywords: Failure to thrive, Risk Factors, Children

Introduction

Failure to thrive has classically been the term used to describe children who are not growing as expected [1] or children with inadequate physical growth [6]. It is a sign not a disease usually seen by the primary health care physicians ,mainly through the first three years of age. the effect of growth potentials are usually prominent through the first three years of age and crossing of percentiles value take place [28].Failure to thrive might be due to organic causes or non - organic causes (psychosocial causes) and sometimes the combination of two and it is more often a multifactorial [10]. The "organic" versus "nonorganic" etiology dichotomy has been replaced by the recognition that most cases of FTT are due to inadequate nutrition secondary to an often complex combination of biological and environmental factors rarely is an underlying serious organic contributory [35]. In 2006 the world health organization (WHO) released new up dated growth charts that include data from six countries and considered breastfeeding as the biologic norm.The child is considered failing to thrive when meeting any of the following criteria:

1.Growth under the third (rd)percentile on the World Health Organization (WHO) weight for age growth charts.

2.Weight for height or Body mass index (BMI) less than the fifth (5^{th}) percentile.

3.Growth patterns that have crossed two major percentiles downward on the weight for age growth charts within 6 months.

4-Growth velocity less than normal for age [19].

Patients and Methods

Study Design

This study was across sectional study.

Place and Time

The data was collected from Al-Batool Teaching hospital for maternity and pediatrics , Baquba , Iraq. From the ward. time of data collection was from the 1^{st} of February 2020-31^{st} of July 2021. data collection and population study two hundred and fifty (250) child were collected from Al-Batool Teaching hospital from department of pediatrics. samples were randomly selected from the ward where the patients were admitted to. target population were, children under 5years information were collected from the patients files including age of the child, weight of the child and gue results. Also the patient parents were of agreat help in data collection regarding information about type of feeding, weaning, birth weight , history of prematurity (age correction was done), economic and educational levels, jobs of parents and history of chronic diseases (in this study most of the chronic diseases were congenial heart diseases).in this study weight for age growth chart was depended to detect children with failure to thrive and this study suggested that urinary tract infection according to gue results and the child symptoms.

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Statistical Analysis

The Analysis of data was carried out using the available statistical package of SPSS-27 (Statistical Packages for Social Sciences-version 27). Data were presented in simple measures of frequency, percentage, mean, standard deviation ،and range (minimum-maximum values).The significance of difference of different means (quantitative data) were tested using Students-t-test for difference between two independent means. The significance of difference of different percentages (qualitative data were tested using Pearson Chi-square test (x2-test) with application of Yate's correction or Fisher Exact test whenever applicable. Statistical significance was considered whenever the P value was equal or less than 0.05. (Wayne W.Daniel and Chad L Cross:10th edition: Biostatistics A Foundation for Analysis in the health science. 2013) ,(B.Dawson and RG Trapp. MC,Graw Hill 4th edition: Basic and Clinical Biostatistics 2004).

Results

Table (1) showed the Frequency distribution according to age groups and gender of all included children in the data. The majority were <12 months 45.2%. Males represent 51.6% and females represent 48.4%.

Table (2) showed the significance of differenc in proportion between males and females,no significant difference between proportions using Pearson Chi-square test at 0.05 level (P value 0.307).Male : female ratio was 1:1.

Table (3) showed the frequency distribution according to socioeconomic level and mother educational level. Regarding socioeconomic levels , medium level was the largest recording 61.6% while high level was the smallest recording 12.8% .And low socioeconomic level represent 25.6% . Regarding Mother education, mothers who have secondary education represent the largest level with 45.6% , While illutrate level(14.0%), primary level 24.0% and college education 16.4%.

Table (4) showed the frequency distribution according to type of feeding, prematurity, chronic diseases, UTI and birth weight. breast feeding recorded 7.6% while bottle feeding was the largest recording 54.0%. and mixed feeding 38.4% . children with prematurity recorded only 2%. children with chronic diseases represent 14%, while children with urinary tract infections (UTI) represent 32.0% . regarding birth weight children with birth weight <2.5 kg represent 21.6% .

Table (5) showed the frequency distribution according to percentiles, children below the 3rd percentile recorded 23.2%

Table 6 showed the frequency distribution according to the presence of failure to thrive (FTT), children with failure to thrive represent about 23.2% while 76.8% of children were of normal growth.

Table (7) showed the significance of difference in percentages of age groups and gender between the two groups using pearson chi-square test. most of the affected children were below 24 months of age with 36.5%with (P value 0.0001) which is considered to be a significant. males with failure to thrive 24.8% and 75.2% of males with normal growth. females with failure to thrive 21.5% and 78.5% females with normal growth. (P value was 0.534) which is considered to be of no significance.

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Table (8) showed the significance of differences in percentages of socioeconomic level and mother education between two groups using pearson chi-square test. children with failure to thrive and low socioeconomic level 68.8 % while 31.3% were with no failure to thrive of the same level. children with failure to thrive and medium socioeconomic level was 6.5% while 93.5% were with no failure to thrive of the same level. children with high socioeconomic level having.

Failure to thrive 12.5% and 87.5% with no failure to thrive of the same level. regarding the level of mother education children with failure to thrive illutrate mother 60.0% , while 40.0 % with no failure to thrive of the same educational level , while primary level mother education is of 41.7% with failure to thrive and 58.3% with no failure to thrive of the same level. secondary level of mother education children with failure to thrive 6.1%.While 93.9% of no failure to thrive of the same mother educational level. mother with college education , children with failure to thrive were 12.2% while 87.8% with no failure to thrive of same mother education level. (P value was 0.0001) which is considered to be a significant.

Table (9) showed the significance of difference in type of feeding, prematurity, chronic diseases, UTI and birth weight percentages of two groups using pearson chi-square test.

Children with breastfeeding have no failure to thrive recorded, as children with breast feeding shows 100% no failure to thrive ,incontrast to bottle feeding which shows that children with bottles feeding and failure to thrive about 37.0% ,while children with bottles feeding and no failure to thrive recording 63.0%, children with mixed feeding and failure to thrive recording 8.3% , while children with mixed feeding and no failure to thrive about 91.7% . (P value was 0.0001) which is considered to be a significant. children with prematurity and failure to thrive was 60.0% ,while children with prematurity and no failure to thrive with was 40.0%, (P value was 0.049) which is considered to be a significant. children with failure to thrive and chronic diseases was 62.9% , while children with chronic diseases and no failure to thrive was 37.1%.(P value was 0.0001) which is considered to be a significant. children with (UTI) and Failure to thrive represent 58.8% , while children with (UTI) and no failure to thrive 41.3%, (P value was 0.0001) which is considered to be a significant. finally children with failure to thrive who had birth weight <2.5 kg was 57.4 % ,while 42.6% with no failure to thrive for the same birth weight ,(P value 0.0001)which is considered to be a significant.

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Table (1): Frequency distribution according to age groups and gender of 250 child

		No	%
Age (months)	<12 months	113	45.2
	12---	74	29.6
	24---	19	7.6
	36---	21	8.4
	=>48months	23	9.2
Gender	Male	129	51.6
	Female	121	48.4

Table (2): Significance of difference in Proportion between males and females(using Pearson Chi-square test)of 250 child

Age (months)	Gender			
	Male		Female	
	No	%	No	%
<12 months	55	42.6	58	47.9
12---	35	27.1	39	32.2
24---	10	7.8	9	7.4
36---	13	10.1	8	6.6
=>48months	16	12.4	7	5.8

P=0.307 (No significant difference between proportions using Pearson Chi-square test at 0.05 level.

Table (3): Frequency Distribution according to socioeconomic level and mother education of 250 child

		No	%
Socio-economic level	Low	64	25.6
	Medium	154	61.6
	High	32	12.8
Mother education	Illiterate	35	14.0
	Primary	60	24.0
	Secondary	114	45.6
	College	41	16.4

Table (4): Frequency Distribution according to type of feeding ,prematurity,chronic diseases,UTI and birth weight of 250 child

		No	%
Type of feeding	Breast	19	7.6
	Bottle	135	54.0
	Mixed	96	38.4
Prematurity	Yes	5	2.0
	No	245	98.0
Chronic disease	Yes	35	14.0
	No	215	86.0
UTI	Yes	80	32.0
	No	170	68.0
Birth weight (Kg)	<2.5Kg (LBW)	54	21.6
	2.5---	54	21.6
	3.0---	132	52.8
	3.5---	6	2.4
	=>4.0Kg	4	1.6

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Table (5): Frequency Distribution according to percentiles of 250 child

		No	%
Percentile (weight for age)	<3percentile	58	23.2
	3---	17	6.8
	5---	24	9.6
	10---	28	11.2
	20---	18	7.2
	30---	8	3.2
	40---	15	6.0
	50---	14	5.6
	60---	15	6.0
	70---	16	6.4
	80---	20	8.0
	90---	6	2.4
	95---	11	4.4

Table (6): Frequency Distribution according to the presence of Failure To Thrive of 250child

		No	%
Failure to thrive	Failure to thrive	58	23.2
	Not	192	76.8

Table (7): Significance of Differences in percentages of age groups and gender between two groups (using Pearson Chi-square test)of 250 child

		Failure to thrive		Not		P value
		No	%	No	%	
Age (months)	<12months	28	24.8	85	75.2	0.0001*
	12---	27	36.5	47	63.5	
	24---	2	10.5	17	89.5	
	36---	-	-	21	100	
	=>48months	1	4.3	22	95.7	
Gender	Male	32	24.8	97	75.2	0.534
	Female	26	21.5	95	78.5	

*Significant difference between percentages using Pearson Chi-square test (χ^2-test) at 0.05 level.

Table (8): Significance of Differences in percentages of socioeconomic level and mother education between two groups (using Pearson Chi-square test) of 250 child

		Failure to thrive		Not		P value
		No	%	No	%	
Socio-economic level	Low	44	68.8	20	31.3	0.0001*
	Medium	10	6.5	144	93.5	
	High	4	12.5	28	87.5	
Mother education	Illutrate	21	60.0	14	40.0	0.0001*
	Primary	25	41.7	35	58.3	
	Secondary	7	6.1	107	93.9	
	College	5	12.2	36	87.8	

*Significant difference between percentages using Pearson Chi-square test (χ^2-test) at 0.05 level.

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Table (9): Significance of Differences in percentages of type of feeding,Prematurity,chronic diseases,UTI and birth weight between two groups (using Pearson Chi-square test)of 250 child

		Failure to thrive		Not		P value
		No	%	No	%	
Type of feeding	Breast	-	-	19	100	0.0001*
	Bottle	50	37.0	85	63.0	
	Mixed	8	8.3	88	91.7	
Prematurity	Yes	3	60.0	2	40.0	0.049*
	No	55	22.4	190	77.6	
Chronic disease	Yes	22	62.9	13	37.1	0.0001*
	No	36	16.7	179	83.3	
UTI	Yes	47	58.8	33	41.3	0.0001*
	No	11	6.5	159	93.5	
Birth weight (Kg)	<2.5Kg (LBW)	31	57.4	23	42.6	0.0001*
	2.5---	12	22.2	42	77.8	
	3.0---	15	11.4	117	88.6	
	3.5---	-	-	6	100	
	=>4.0Kg	-	-	4	100	

*Significant difference between percentages using Pearson Chi-square test (χ^2-test) at 0.05 level.

Discussion

The term failure to thrive is used to describe growth failure that accompanies many pathologic conditions as well as psychosocial causes. differentiation between organic (biomedical) and nonorganic (psychosocial/environmental) is not always useful; children often have a combination of psychosocial and biomedical problems. children with medical conditions will often have psychosocial issues related to eating and dysfunctional feeding patterns with caregivers. children with primarily social or emotional issues around eating may develop medical consequences of undernutrition [19]. In this study there was a significant correlation between failure to thrive and the age of the child, in this study failure to thrive was significant in children less than 24 months of age. starting from the first year and reaching peak through the second year of life. this study agreed with the study [27] another study showed a significant correlation between age groups and the incidenc of failure to thrive, [17] which showed that failure to thrive was significant in children from 12-23 months. a study [22,24], said that there was a significant correlation between age groups and the incidence of failure to thrive were it was significant in less than 12 months infants. The period of the 1st year is the period of rapid growth and growth continues throughout the second year followed by a slight slowby the end of the second year, so that crossing percentiles usually takes place in this period.

Considering gender, in this study there was no significant correlation between gender and

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the incidenc of failure to thrive, which agreed with the studies [22] ,[11], [14] ,[27].

While other studies showed a significant correlation between failure to thrive and gender as in study [17] which showed that failure to thrive has significantly correlated with gender and its more in males.

On the other hand some studies said that there was a significant correlation between failure to thrive and gender and it was more in females as in studies [29] and [4].

Possible explanation was that some societies pay more attention for males than for females. significant correlation was detected in this study between failure to thrive and low socioeconomic level, which is agreed with the study [14] also agree with study [22] ,as poverty plays a major role in the progress of failure to thrive due to food insecurity which inturn led to defective caloric intake.

In this study there was a significant correlation between failure to thrive and mother educational level which agreed with the studies [17], [22], [14] ,[4] and [27]while study [13] and [9] showed that there was no significant correlation between failure to thrive and mother educational level.

In this study there was significant correlation between failure to thrive and the type of feeding which agreed with the study by [9] ,while other study showed that children with breastfeeding were less likely to develop failure to thrive [4].while a studies [27] showed that there was no significant correlation between failure to thrive and the type of feeding.

In this study failure to thrive was more common in bottle fed children this might be due to improper formula preparation either it was too diluted or due to improper bottle sterilization leading to gastroenteritis.

In this study there was a significant correlation between failure to thrive and prematurity which agreed with the study [30] and another study [7],while other study showed that there was no significant correlation between failure to thrive and prematurity as in study [3]. Inadequate postnatal nutrition is an important factor contributing to growth failure, as most extremely low birth weight infants experience major protein and energy deficits during the neonatal intensive care unit hospitalization, in spite of the fact that nutrition sufficient to support intrauterine growth rates can generally be provided safely.

In this study there was a significant correlation between birth weight less than 2.5kg and the development of failure to thrive. most of studies agreed with the fact that birth weight less than 2.5 kg has direct correlation with growth impairment as in studies [11], [40] , [14] , [17].

In this study there was a significant correlation between failure to thrive and the presence of urinary tract infections (uti) ,which agreed with the studies [18], [36], [38].

Urinary tract infection in pediatrics lead to fever, poor feeding and vomiting ,some children have higher chance of developing urinary tract infection such as:male gender,uncircumcised male , male younger than one year old and female younger than four years of age,having previous urinary tract infection might increase the chances of having another one.urinalysis should be

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routinely done in all children with failure to thrive.

In this study there was a significant correlation between failure to thrive and the presence of chronic diseases(most of diseases in this study were congenial heart diseases), which agreed with [34] , [20] , [31] , [25].

Failure to thrive in infants with congenital heart disease may be due to a combination of low energy intakes and, in some cases, high energy requirements allowing insufficient energy for normal growth. increasing the energy intakes of infants with congenital heart disease may be a way of improving their growt.

Conclusions

Failure to thrive was significantly correlated with poverty, chronic diseases , premature birth, UTI and low birth weight recommendations

1. Rising mother education .
2.Encouraging breastfeeding, enhancing health education sessions about the importance of breastfeeding for at least the first 6 months.
3. Screening for urinary tract infections for children with growth impairment.
4. Further study is required for more sample size

Recommendations

1. Rising mother education .
2.Encouraging breastfeeding, enhancing health education sessions about the importance of breastfeeding for at least the first 6 months.
3. Screening for urinary tract infections for children with growth impairment.
4. Further study is required for more sample size.

Source of funding: The current study was funded by our charges with no any other funding sources elsewhere.

Ethical clearance: This study was approved by the ethics committee of the College of Medicine. Participation in the study was optional, and the respondents were ensured that their responses would be kept confidential and private, and the collected information would only be used for research purposes. Anonymity was ensured by not mentioning their names.

Conflict of interest: Nil

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قصور النمو وعوامل الخطورة لدى الاطفال دون الخمس سنوات في مستشفى البتول التعليمي في مدينة بعقوبة

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الملخص

خلفية الدراسة: يشير القصور في النمو (FTT) إلى زياده الوزن بشكل غير كاف او عدم وجود نمو جسدي مناسب، فهو علامة وليس تشخيصا يلاحظ عاده من قبل اطباء الرعاية الصحية الأولية. قد يكون راجعا إلى اسباب عضوية او غير عضوية وعادة مايكون متعدد العوامل بالنسبة للمسببات.

اهداف الدراسة: لبيان مدى انتشار فشل النمو (FTT). والعوامل المساهمه له في فئه الاطفال دون الخمس سنوات في مستشفى البتول التعليمي في مدينه بعقوبه ٢٠٢٠ – ٢٠٢١.

المرضى والطرائق: هذه الدراسة هي دراسة مقطعية،أجريت في مستشفى البتول التعليمي للاطفال والنسائية في مدينه بعقوبة-محافظة ديالى خلال الفتره من ١ شباط ٢٠٢٠-٣١ تموز ٢٠٢١. خلال هذه الدراسة تم اختيار (٢٥٠) عينه بشكل عشوائي في فئة الاطفال دون الخمس سنوات. تم جمع المعلومات من ملفات المرضى الراقدين في المستشفى بما في ذلك العمر والوزن الحالي والوزن عند الولاده، نوع التغذيه، الفطام ، الخداج، تاريخ الامراض المزمنة والظروف الاجتماعية والاقتصادية.

النتائج: أظهرت ان الاطفال دون سن ١٢ شهرا كانت النسبة الأكبر حوالي (٤٥,٢%) ،نسبه الذكور كانت ٥١,٦%).
فيما يتعلق بتعليم الام :تمثل الأمهات الحاصلات على تعليم ثانوي أعلى نسبه ب ٤٥,٦% ، وكانت نسبة الاطفال الذين اعتمدوا على الزجاجة او الرضاعة الصناعية في تغذيتهم أعلى نسبه ب٤٥,٠% ، الولاده المبكره مثلت ٢,٠% ،الاطفال المصابون بالامراض المزمنة ١٤% والأطفال المصابون بالتهاب المسالك البولية ٣٢%. بلغت نسبة الاطفال الذين يعانون من فشل النمو ٢٣,٢% بينما كان ٧٦,٨% ذوي نمو طبيعي. فيما يخص الفئات العمرية كان معظم الاطفال الذين يعانون من فشل النمو اقل من ٢٤ شهرا، بنسبه ٣٦ % وكانت قيمه الاحتمالية (p value)هي (٠,٠٠٠١) والتي تعتبر ذات دلالة احصائية. فيما يتعلق بالأطفال ذوي المستوى الاجتماعي والاقتصادي المنخفض و فشل النمو كانت نسبتهم ٦٨,٨ % وكانت قيمه الاحتمالية (p value) هي (٠,٠,٠٠٠١) وهي ذات دلاليه احصائيه. لم يظهر الاطفال الذين يعتمدون في تغذيتهم على الرضاعة الطبيعية اي حاله فشل نمو، بينما كانت نسبه الاطفال الذين اعتمدوا على الزجاجة او الرضاعة الصناعية وكانوا يعانون من فشل النمو ٣٧%.

الاستنتاجات: هذه الدراسة استنتجت ان الفشل في النمو يرتبط ارتباطا وثيقا مع وجود الفقر، ومستوى التعليم لدى الام، وجود الأمراض المزمنة لدى الطفل كما ويرتبط أيضا بالوزن عند الولاده ووجود التهابات المسالك البولية ونوع الرضاعة. بينما لايرتبط بجنس الطفل.

الكلمات المفتاحية: قصور النمو ، عوامل الخطورة ،الاطفال

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