



A STUDY ON NUTRITIONAL ASSESSMENT OF CHILDREN AGED 6 - 12 YEARS ATTENDING PEDIATRIC OUTPATIENT DEPARTMENT

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ABSTRACT **Background:** Malnutrition begins before birth, usually persists through adolescence and adulthood and can affect multiple generations. This study was undertaken to assess the nutritional status of children based on clinical and anthropometric measurements. **Objective:** To study the prevalence of wasting and stunting among study subjects and classify them based on age and sex, also the prevalence of nutritional deficiencies among study subjects. **Results:** Prevalence of underweight in this study was 39% with higher prevalence in girls 45.8%, with highest among 6 year children (68.5%) and least among 12 year children. Overall prevalence of stunting was 36.5% with higher prevalence in girls (42.3%) than boys (32%). Prevalence of stunting was highest in children of 6 year age group 55.5% and least in 12 year children 17.1%. Prevalence of vitamin B deficiency signs was 28% with 16.5% among girls and 11.8% among boys. Prevalence of iron deficiency signs was 65% among boys and among girls it was 29% and 36% respectively. Prevalence of vitamin A deficiency signs was 5.8% with prevalence in girls (3.1%) higher than boys (2.6%). **Conclusion:** The overall prevalence of underweight and stunting was higher among girls than among boys, and a significantly higher prevalence of vitamin deficiency signs like iron, vitamin B 12, vitamin A are seen in girl children than boys emphasizing more focused nutrition of girl child.

KEYWORDS : Malnutrition, Vitamin deficiency, Underweight, Stunting.

INTRODUCTION

Girls and women, in particular, face nutritional problems throughout their lives. There's also a correlation between foetal malnutrition and an increased chance of developing chronic diseases as an adult. As a result, preventing malnutrition at all phases of life is critical.

In comparison to other economically poor country like Africa, proportion of underweight children in India is high (36%)². Even in years of significant economic expansion, malnutrition did not decrease.

Large group of studies are focused on nutritional assessment of under 5 year children in India with paucity of literature emphasizing the nutritional status among children of 6 to 12 years. This present study helps in bridging this gap in understanding nutritional assessment of these children in a modest way possible.

PATIENTS AND METHODS

STUDY DESIGN - Hospital based cross sectional study.

STUDY SETTING - Government General Hospital, Kakinada.

INCLUSION CRITERIA-

Children of age 6 to 12 years attending OPD.

EXCLUSION CRITERIA-

1. Children below 6 years and above 12 years of age.
2. Children with major congenital anomalies, genetic problems, chronic diseases.
3. Children of those parents/caregivers who didn't give consent.

METHODOLOGY:

All the children included in the study were taken anthropometric measurements like weight using digital weighing scale and height by using stadiometer. Classification of the study subjects into underweight was by using World Health Organisation (WHO) grading system for children upto 9 years, for 10 to 12 years children by CDC grading and grading of stunting by using WHO grading system only.

Prevalence of iron deficiency was identified by signs like pallor, nail changes like spooning and signs of vitamin A deficiency was noted by signs like conjunctival xerosis, bitots spots. Signs of dental caries and signs of vitamin B deficiency like glossitis, chelitis, angular stomatitis, aphthous ulcers have also been checked in all study subjects.

STUDY PERIOD: The study period was one and half years, i.e., 1st

January 2020 to 30th June 2021

STUDY TOOLS : Digital Weighing Scale, Stadiometer

RESULTS

Table 1. GRADING OF WEIGHT FOR AGE OF 6 - 9 YEAR OLD BOYS STUDIED (according to WHO classification)

AGE	TOTAL	NORMAL	MODERATELY UNDERWEIGHT < - 2 S.D.	SEVERELY UNDERWEIGHT < - 3 S.D.	TOTAL
6	30	8	12	10	73.3 %
7	40	20	12	8	50%
8	30	22	5	3	26.6 %
9	30	24	4	2	20 %

This table shows grading of weight for age for 6 to 9 year old children with majority of boys with underweight belonged to 6 years (73.3%)

Table 2. GRADING OF WEIGHT FOR AGE OF 10 - 12 YEAR OLD BOYS STUDIED (according to CDC grading)

AGE	TOTAL	NORMAL	UNDERWEIGHT < - 2 S.D.	PREVALENCE
10	25	20	5	20 %
11	35	29	6	17.1 %
12	20	17	3	15 %

The above table shows CDC grading of weight for age for boys of 10 to 12 years with underweight. children having weight for age < -2 S.D. prevalence of underweight among 10 year old boys was 20 % and among 11 and 12 year old boys were 17.1 % and 15 % respectively.

Table 3. GRADING OF WEIGHT FOR AGE OF 6 - 9 YEAR OLD GIRLS STUDIED (according to WHO classification)

AGE	TOTAL	NORMAL	MODERATELY UNDERWEIGHT < - 2 S.D.	SEVERELY UNDERWEIGHT < - 3 S.D.	PREVALENCE
6	24	9	2	13	62.5%
7	30	12	9	9	60%
8	35	20	8	7	42.8%
9	26	15	5	6	42.3%

This table shows grading of weight for age among girls with highest number of girls with underweight were 6 year old with 62.5 %.

Table 4. GRADING OF WEIGHT FOR AGE AMONG 10 - 12 YEAR GIRLS STUDIED (according to CDC grading)

AGE	TOTAL	NORMAL	UNDERWEIGHT < -2 S.D.	PREVALENCE
10	25	15	10	40%
11	15	10	5	33.3%
12	15	11	4	26.6%

Above table shows grading of weight for age among 10 to 12 year old children. This showed 40 % , 33.3 % and 26.6 % prevalence among children of 10, 11 and 12 years respectively.

Table 5. WHO GRADING OF HEIGHT FOR AGE AMONG BOYS STUDIED -

AGE	TOTAL	NORMAL	STUNTED	SEVERELY STUNTED	PREVAL ENCE
6	30	15	3	12	50%
7	40	25	3	12	37.5%
8	30	20	6	4	33%
9	30	21	4	5	30%
10	25	18	5	2	28%
11	35	27	6	2	22.8%
12	20	17	3	0	15%
TOTAL	210	143	30	37	67(32%)

Above table shows prevalence of stunting among boys included in study. Highest prevalence of stunting was noted among lower age groups 6 and 7 with 50% and 37.5 % respectively.

Table 6. WHO GRADING OF HEIGHT FOR AGE AMONG GIRLS STUDIED -

AGE	TOTAL	NORMAL	STUNTED	SEVERELY STUNTED	PREVAL ENCE
6	24	9	4	11	62.5%
7	30	10	2	18	66.6%
8	35	22	7	6	37.1%
9	26	17	5	4	34.6%
10	25	17	4	4	32%
11	15	11	2	2	26.6%
12	15	12	2	1	20%
Total	170	98	26	46	72 (42.3%)

Above table depicts grades of stunting among girls in the study group. Highest prevalence was noted among lower age groups with 62.5% prevalence among 6 year girls and 66.6% among 7 year girls.

Table 7. PREVALENCE OF VITAMIN B DEFICIENCY SIGNS AMONG STUDY SUBJECTS-

AGE	TOTAL	GIRLS	BOYS	PREVALENCE
6	54	14	12	26 (48.1%)
7	70	10	9	19 (27.1%)
8	65	11	6	17 (26%)
9	56	9	5	14 (25%)
10	50	8	4	12 (24%)
11	50	7	5	12 (24%)
12	35	4	4	8 (22.8%)
Total	380	63(16.5%)	45(11.8%)	108 (28%)

Above table shows vitamin B deficiency signs among children studied. Highest prevalence was noted in children of 6 year age group (48.1%). Among all the children studied prevalence among girls (16.5%) is high when compared to boys (11.8%) P value is <0.05 for both age and sex which shows statistically significance.

Table 8. PREVALENCE OF IRON DEFICIENCY SIGNS AMONG STUDY SUBJECTS-

AGE	TOTAL	GIRLS	BOYS	Prevalence
6	54	21	22	43 (79.6%)
7	70	27	24	51(72.8%)
8	65	24	21	45(69.2%)

9	56	21	18	39 (69.6%)
10	50	22	10	32 (64%)
11	50	12	10	22(44%)
12	35	10	5	15(42.8%)
TOTAL	380	137(36%)	110(29%)	247(65%)

P value < 0.05

Above table shows prevalence of iron deficiency signs among children. Highest prevalence was noted in 6 year age children (79.6%) with lowest prevalence among children of 12 year age group (42.8%). On a whole In comparison between boys and girls, girls (36%) had high prevalence of iron deficiency than boys (29%). Overall prevalence of iron deficiency signs among study subjects is 65% in this study. P value is <0.05 which shows statistical significance.

Table 9. PREVALENCE OF VITAMIN A DEFICIENCY SIGNS AMONG STUDY SUBJECTS -

AGE	TOTAL	BOYS	GIRLS	TOTAL
6	54	4	5	9 (16%)
7	70	3	4	7 (10%)
8	65	0	2	2 (3%)
9	56	2	1	3(5.3%)
10	50	1	0	1 (2%)
11	50	0	0	0
12	35	0	0	0
TOTAL	380	10 (2.6%)	12 (3.1%)	22 (5.8%)

P value > 0.05 statistically insignificant

The above table shows prevalence of vitamin A deficiency signs among all the children studied. Highest prevalence was seen in children of 6 year group children (16%). Girls have a slightly high prevalence (3.1%) when compared to boys (2.6%).

DISCUSSION

The present study aims at assessing the nutritional status of children of 6 to 12 years attending outpatient department, and prevalence of wasting, stunting and specific nutritional deficiencies in the studied children. Child growth is a recognised as an important public health indicator for monitoring nutritional status and health in a population.

According to recent NFHS 5 reports , prevalence of underweight was 32.1 % and stunting was 35.5% among under 5 children and pitfall of these reports are that it doesn't include children of 6 to 12 years.

PREVALENCE OF UNDERWEIGHT BASED ON GENDER WISE DISTRIBUTION OF STUDY SUBJECTS –

In the present study, a higher prevalence of prevalence of underweight Was noted among girls 45.8% (78/170)when compared to boys 33.3% (70/210). Some other studies which showed similar higher prevalence among girls were Shashank et al¹ (girls 38.6% and boys 31.4%) and Cynthia et al⁷ which also observed higher prevalence of underweight among girls.

TABLE 10. COMPARISON OF UNDERWEIGHT BASED ON GENDER WISE DISTRIBUTION OF STUDY SUBJECTS -

AUTHOR	YEAR	PREVALENCE AMONG BOYS	PREVALENCE AMONG GIRLS
Sandeep et al	2018	50%	49%
Shashank et al	2016	31.4%	38.6%
Chandramohan et al	2015	55%	47%
Mondal et al	2015	39.7%	36.5%
Amruth et al	2015	31.3%	21.3%
Shivaprakash et al	2015	32.3%	28.3%
Srivatsava et al	2012	30%	37%
Present study		33.3%	45.8%

PREVALENCE OF STUNTING –

Present study revealed a total prevalence of stunting of 36.5% (139/380) among children included with p value <0.05 showing statistical significance.

The prevalence noted was higher when compared to other studies like Shivaprakash et al⁸ (27.8%) , Srivatsava et al¹⁵ (19.9%), Fazili et al¹⁵ (9.25%), Chamar et al¹⁶(12.2%), kumawat et al¹⁷(9.8%), shashank et al⁴(25%), Amruth et al⁹(19.2%).

Prevalence noted in this study was comparatively lower than studies like Sandeep et al³ (49%), Sethy et al¹¹ (42%), Sati & Dahiya et al¹⁰ (45.7%).

TABLE 11. COMPARISON OF PREVALENCE OF STUNTING WITH OTHER STUDIES –

AUTHOR	YEAR	PREVALENCE
Sandeep et al	2018	49%
Sethy et al	2017	42%
Kumawat et al	2016	9.86%
Shashank et al	2016	25%
Amruth et al	2015	19.2%
Chamar et al	2015	12.2%
Shivaprakash et al	2014	27.8%
Srivatsava et al	2012	19.9%
Fazili et al	2012	9.25%
Sati , dahiya et al	2012	45.7%
Present study		36.5%

PREVALENCE OF STUNTING BASED ON GENDER WISE DISTRIBUTION –

This shows higher prevalence of stunting among girls in the study. This is similar to other studies done by Shashank et al⁴, Srivatsava et al⁵, and kumar et al⁶.

TABLE 12. COMPARISON OF PREVALENCE OF STUNTING AMONG STUDY SUBJECTS BASED ON GENDER WISE DISTRIBUTION WITH OTHER STUDIES -

AUTHOR	YEAR	PREVALENCE AMONG BOYS	PREVALENCE AMONG GIRLS
Kumar et al	2019	13%	23%
Sandeep et al	2018	50%	49%
Shashank et al	2016	24.2%	26.4%
Mondal et al	2015	26.1%	22.9%
Shivaprakash et al	2015	29.1%	26.5%
Amruth et al	2015	22.4%	15.7%
Srivatsava et al	2012	18%	22 %
Present study		32%	42.3%

PREVALENCE OF IRON DEFICIENCY SIGNS –

In comparison with other studies, Errayya et al¹² found 50% prevalence of anaemia with 29% among girls and 21% among boys. Srivatsava et al⁵ found overall prevalence of 37.5% with higher prevalence in girls (42.8%) when compared to boys (33.7%). Hina, kausar et al¹⁴ found 22.7% prevalence with 27.8% among girls and 16.9% among boys.

TABLE 13. COMPARISON OF PREVALENCE OF IRON DEFICIENCY AMONG STUDY SUBJECTS WITH OTHER STUDIES -

AUTHOR	YEAR	PREVALENCE
Praveen kumar et al	2021	22.6%
Sandeep et al	2018	9%
Hina , kausar et al	2016	22.7%
Errayya et al	2014	50%
Shivaprakash et al	2014	25.4%
Srivatsava et al	2012	37.5%
Present study		65%

PREVALENCE OF VITAMIN A DEFICIENCY -

In comparison with other studies, Errayya et al¹² showed 19% prevalence with 11.6% among boys and 7.5% among girls. Nongrum et al¹⁹ found prevalence of 5.9% with 7.3% among boys and 4.2% among girls.

TABLE 14. COMPARISON OF PREVALENCE OF VITAMIN A DEFICIENCY AMONG STUDY SUBJECTS WITH OTHER STUDIES -

AUTHOR	YEAR	PREVALENCE
Batta M. et al	2016	7.18%
Nongrum et al	2015	5.9%

Errayya et al	2014	19%
Srivatsava et al	2012	3.4%
Shivaprakash et al	2014	20.7%
Present study		5.8%

PREVALENCE OF VITAMIN B DEFICIENCY SIGNS -

Comparing with other studies like Praveen et al¹³ found prevalence of 18% and Batta M. et al¹⁸ found prevalence of 18%.

TABLE 15. COMPARISON OF PREVALENCE OF VITAMIN B DEFICIENCY SIGNS WITH OTHER STUDIES -

AUTHOR	YEAR	PREVALENCE
Praveen kumar et al	2021	18%
Batta M. et al	2016	18%
Present study		28%

SUMMARY

1. Prevalence of underweight in this study was 39% with higher prevalence in girls 45.8% and 33.3% in boys emphasizing need of improvement in nutrition of girl child.

2. Prevalence of underweight was highest among 6 year children (68.5%) and least in 12 year children (20%) with significant p value <0.05.

3. Overall prevalence of stunting was 36.5% with higher prevalence in girls (42.3%) than boys (32%)

4. Prevalence of stunting was highest in children of 6 year age group 55.5% and least in 12 year children 17.1% with significant p value <0.05.

5. Prevalence of vitamin B deficiency signs was 28% with 16.5% among girls and 11.8% among boys with statistically significant p value <0.05.

6. Prevalence of iron deficiency signs was 65% with prevalence among boys and girls was 29% and 36% respectively (p value <0.05, statistically significant)

7. Prevalence of vitamin A deficiency signs was 5.8% with prevalence in girls (3.1%) higher than boys (2.6%).

Conclusion:

The overall prevalence of underweight and stunting was higher among girls than among boys, and a significantly higher prevalence of vitamin deficiency signs like iron, vitamin B 12, vitamin A are seen in girl children than boys emphasizing more focused nutrition of girl child.

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