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EXTEND OF WEIGHT LOSS FOLLOWING ACUTE ILLNESSES IN CHILDREN FROM 1 TO 11 YEARS OLD

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Abstract

BACKGROUND: Children with emergency situations require immediate resuscitation and lifesaving interventions. Unlike adults, medications, fluids, equipment sizes and drug dosages used among paediatric patient is based on weight; even small changes in weight produce significant impact, especially in administering drugs with lower window of safety. This study was done to assess the extent of weight loss produced by different acute illnesses when compared with normal children. **AIM AND OBJECTIVE:** To assess the extent of weight loss produced by different acute illnesses in paediatric population 1 to 10 years old. **SETTINGS AND DESIGN:** This was a prospective study conducted in the Department of Pediatrics, Saveetha Medical college, during the time period June- December 2023. **MATERIALS AND METHODS:** Children with acute illness visiting the health facility were recruited by convenience sampling. Basic demographic details like name, age, gender, standard from the parents. Patients actual weight was taken by digital weighing scale, prior to measurement, the footwear and heavy clothings were removed. **STATISTICAL ANALYSIS:** Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency and proportion for categorical variables. All Quantitative variables were checked for normal distribution within each category of explanatory variable by using visual inspection of histograms and normality Q-Q plots. Shapiro- wilk test conducted to assess normal distribution and p value of >0.05 was considered as normal. P value < 0.05 was considered statistically significant. IBM SPSS version 26 was used for statistical analysis. **RESULTS:** The mean actual weight in kg, with the children is having gastritis with pre admission weight of 35 ± 0, post admission weight of 32.80 ± 0.42 between two weight was statistically significant (P value<0.001). There was a very strong positive correlation between Actual Weight in kg with the children with gastritis pre admission and post admission. **CONCLUSION:** Significant difference in weight (loss/gain) was noticed in some acute illness, especially acute gastritis.

Keywords: Acute Weight Loss, Acute İllness, Weight, Acute Gastritis, Diarrhoea.

INTRODUCTION

Accurate measurement of weight becomes important in paediatrics, especially in emergency situations while using many life-saving medications. This becomes very important in conditions like administering drugs with lower window of therapeutic safety, intravenous fluid correction, fluid replacement in burns patients or transfusion requirements, and emergency situations like patient may be immobilization following spinal trauma, trauma care or undergoing any emergency interventions such as intubation, ICU care, defibrillation energy doses etc., are calculated based on the weight of the individual child. Several weight estimation methods have been published in the literature. It varies from use of simple digital weighing machines by parents and health care workers; to use of various formulae using child's age, such as the Advanced Pediatric Life Support, Luscombe-Owens, and Nelson formulae. These formulae are often recommended in pediatric textbooks and as part of national pediatric resuscitation courses. Length-based methods have included the use of weight-for-length data from large data sets such as the National Health and Nutrition Examination Survey (NHANES) or those from the World Health Organization (WHO), and formulae derived through regression. [1,2]

The Broselow tape, based on NHANES data, is the most widely used length-based method. In such emergency situations we can use alternate methods for weight calculation like broselow tape. If broselow tape is not available we can use some other formulas to calculate the weight and may not significantly affect the dosage in acute illnesses [3]. Effect of climatic and temperature variation and drinking pattern of children will also affect weight loss especially in acute illness [4]. Acute illness produces weight loss, especially if superimposed on any preexisting conditions. Hence acute illness due to anorexia, severity of illness etc may produce clinically significant weight loss which may interfere with drug administration and metabolism, recovery from illness or even side effects. There are reports of unintentional weight loss-defined as weight loss of at least 5% of the patient's initial weight that occurs within the preceding 6-12 months and not the expected consequence of treatment of a known illness [1]. Similar scenario may arise in acute illness also, especially if superimposed on any preexisting conditions. Hence this study was undertaken to understand the difference in variation in weight following acute illnesses especially in hot climate versus cold climate with respect to drinking patterns and whether different methods of calculating weight produces significant differences in weight.

Aim:

To assess the extent of weight loss produced by different acute illnesses in paediatric population 1 to 10 years old.

Objective:

- To investigate the extend of weight loss produced by different acute illnesses and condition in children.
- To compare the weight loss, if any, produced by the acute factors in normal children.

MATERIALS AND METHODS

This was a prospective study conducted in the Department of Pediatrics, Saveetha Medical college, during the time period June- December 2023. Children were recruited by convenience sampling. Accordingly, 250 children without preexisting illness between 1-10 years were recruited after obtaining consent**.** Measuring the weight by using digital weighing scale, when the children got admitted in hospital for different acute illnesses like gastritis, viral fever, respiratory tract infections, anemia due to acute blood etc. and comparing with pre admission recorded weight and to look for role of acute illness in causing significant weight loss during hospitalization.

Definitions:

Acute illness- for the purpose of this study universally accepted definition of "any illness of rapid/sudden onset but clearing within 1 month" is considered as acute illness [5].

Significant weight loss: 5% weight loss over previous weight during the period of illness [6].

Inclusion criteria:

- Those who are willing to participate in the study
- Age group between 1 year to 10 years
- Children getting admitted for acute illness in SMCH paediatric ward and causality.

Exclusion criteria:

- Children with chronic illnesses.
- Children with known syndromes, metabolic disorders, malignancies, TB, Connective tissue disorders etc

METHODOLOGY

Basic demographic details like name, age, gender, standard was obtained from the parents. Since weight is a parameter which can vary depending on many parameters including socioeconomic and dietary acting as confounding factors, which are dependent on the child's age and sex, both age and sex matched controls were selected. Children who were getting admitted in paediatric ward due to acute illness and staying for more than a week like gastritis, asthma, AGE, dengue, fever, abdominal pain etc., were randomly selected as cases. Footwear and heavy clothing were removed and children were weighed using digital weighing machine. Comparing the weight of age and sex matched normal children with those having acute illnesses gave an understanding of the extent of weight loss in different acute conditions. The weight obtained using different methods were compared for significance of change.

STATISTICAL ANALYSIS

Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency and proportion for categorical variables. Data was also represented using appropriate diagrams like bar diagram, pie diagram and box plots. All Quantitative variables were checked for normal distribution within each category of explanatory variable by using visual inspection of histograms and normality Q-Q plots. Shapiro- wilk test was also conducted to assess normal distribution. Shapiro wilk test p value of >0.05 was considered as normal distribution. P value < 0.05 was considered statistically significant. IBM SPSS version 26 was used for statistical analysis.

RESULTS

The Prospective study was designed to evaluate the extend of weight loss in different acute illnesses like gastritis, dengue, viral fever, respiratory tract infections etc. and compared with normal children. The total of 250 children who satisfied the inclusion and exclusion criteria were included in the study and grouped according to age, gender, standard and diagnosis of the child.

All the 250 children were having normal diet and drinking habits their liquid consumption was age appropriate except for few who had severe vomiting. Drinking pattern varies considerably with age and climatic conditions, in addition to severity and cause of illness. Recommended daily fluid intake for 1 to 4 years is 820ml, 4 to 7 years is 940ml, 7 to 10 years is 970ml and 10 to 11 years is 1170ml. 129 children (79%) of

1 to 4 years consumed adequate liquids, 37 children (15%) of 4 to 7 years consumed adequate fluids.

Table 1: Comparison of pre admission weight between disease

	N	Pre admission weight Mean ± SD	Mean difference	95% CI		P value
				Lower	Upper	
Normal baby	14	14.23 ± 8.46				
Abdominal pain	3	19.33 ± 12.66	-5.10	-13.206	2.997	0.216
Acute exacerbation of wheeze	4	20.25 ± 10.62	-6.02	-13.241	1.198	0.102
Acute gastroenteritis	3	13.17 ± 5.51	1.06	-7.039	9.163	0.796
Anaemia due to acute blood loss	3	17.83 ± 6.45	-3.60	-11.706	4.497	0.381
Asthma	4	19.88 ± 13.49	-5.65	-12.866	1.573	0.125
sinusitis	3	15.33 ± 3.51	-1.10	-9.206	6.997	0.788
Dengue fever	7	15 ± 10.52	-0.77	-6.666	5.123	0.797
Fever	24	15.66 ± 7.47	-1.44	-5.560	2.683	0.492
Finger contracture due to any trauma	3	21.93 ± 13.78	-7.70	-15.806	.397	0.062
Gastritis	9	35 ± 0	-20.77	-30.397	-11.146	<0.001
Head injury	4	12.13 ± 2.66	2.10	-5.116	9.323	0.566
Skin infection	3	19.13 ± 13.74	-4.90	-13.006	3.197	0.234
Hirschprung's disease	2	14.90 ± 4.10	-0.67	-10.297	8.954	0.891
Acute otitis media	7	15.21 ± 9.19	-0.99	-6.880	4.909	0.742
Insect bite	4	12.63 ± 2.50	1.60	-5.616	8.823	0.662
Keloid	2	20 ± 2.83	-5.77	-15.397	3.854	0.239
Lower respiratory tract infection	50	13.30 ± 4.99	0.93	-2.922	4.779	0.635
Pharyngitis	4	15.25 ± 5.63	-1.02	-8.241	6.198	0.781
Symptomatic Phimosis	12	13.71± 5.21	0.52	-4.489	5.530	0.838
Pneumonia	8	13.50 ± 2.74	0.73	-4.915	6.372	0.799
Sebaceous	2	16.25 ± 5.30	-2.02	-11.647	7.604	0.679
Simple febrile seizure	11	14.14 ± 4.87	0.09	-5.038	5.223	0.972
Tonsillitis	7	15.57 ± 5.47	-1.34	-7.237	4.552	0.654
Upper respiratory tract infection	15	14.67 ± 5.58	-0.44	-5.170	4.294	0.855
Urticaria	3	14.17 ± 4.01	0.06	-8.039	8.163	0.988
Urinary tract infection	3	12.67 ± 6.03	1.56	-6.539	9.663	0.704
Vaccination	3	18.33 ± 5.86	-4.10	-12.206	3.997	0.319
Viral fever	28	12.11 ± 3.99	2.12	-2.047	6.290	0.317
Wheeze associated lower respiratory tract infection	6	16.25 ± 4.79	-2.02	-8.235	4.192	0.522

Table 1 shows the pre admission weight of different acute illnesses, with mean ± standard deviation of gastritis children is 35 ± 0, with significant P value of <0.001.

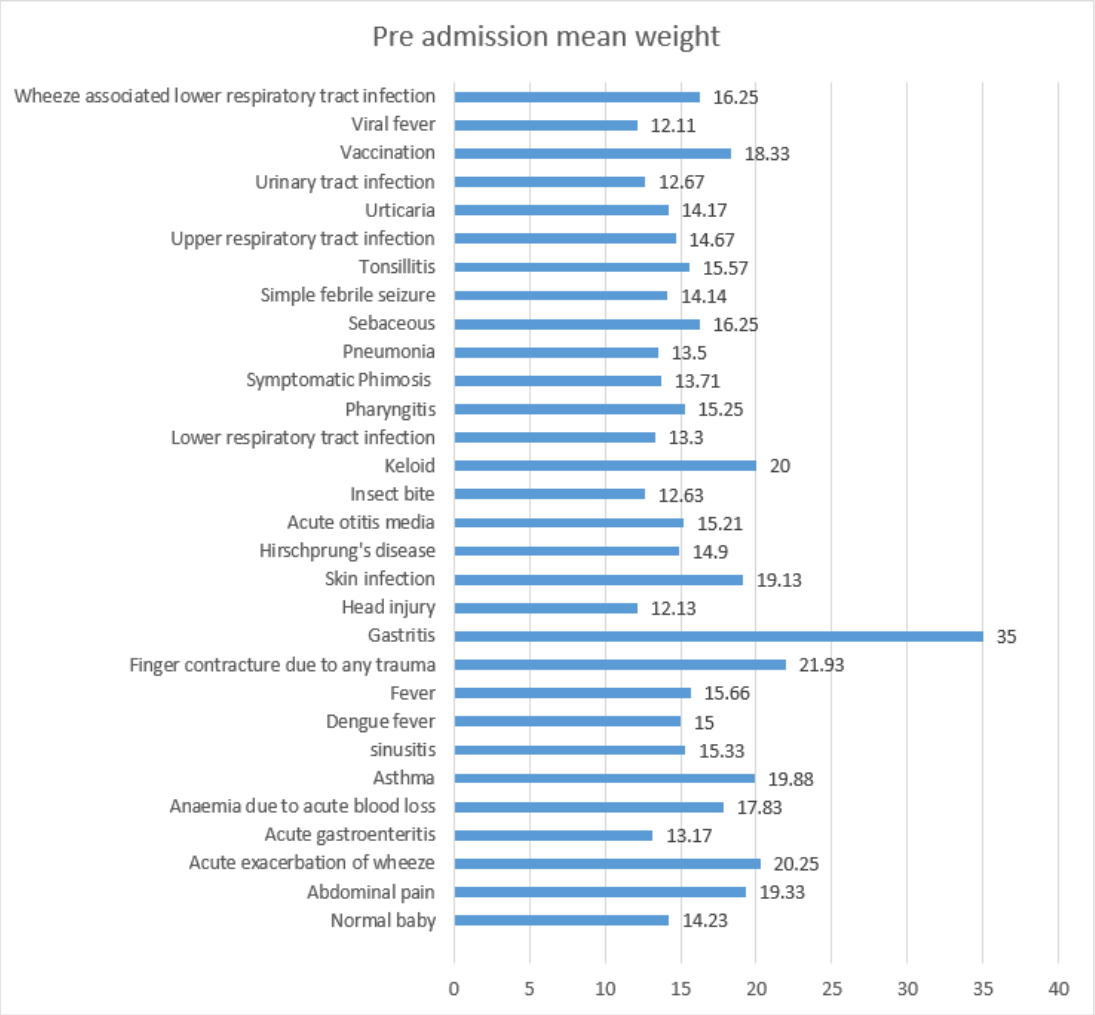
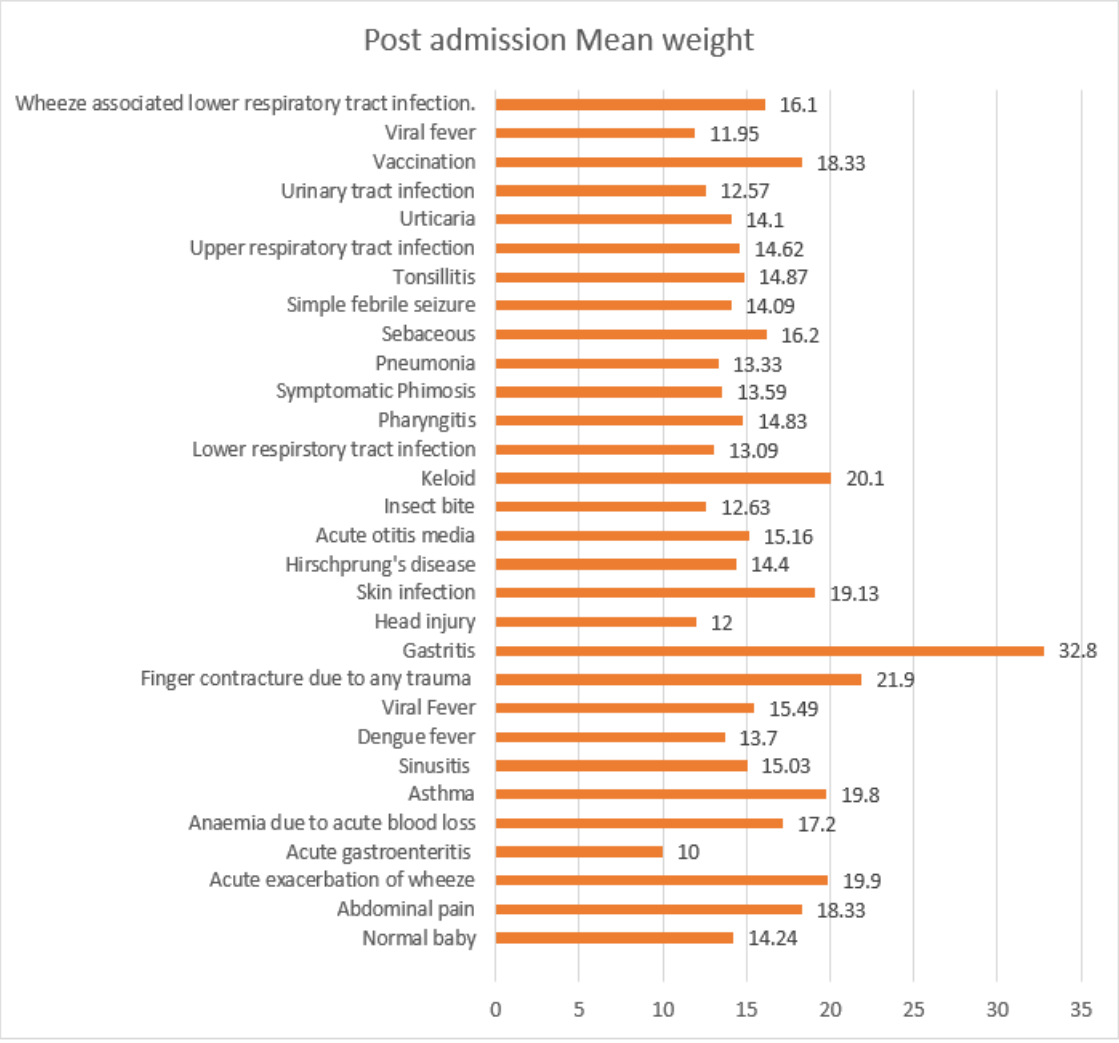


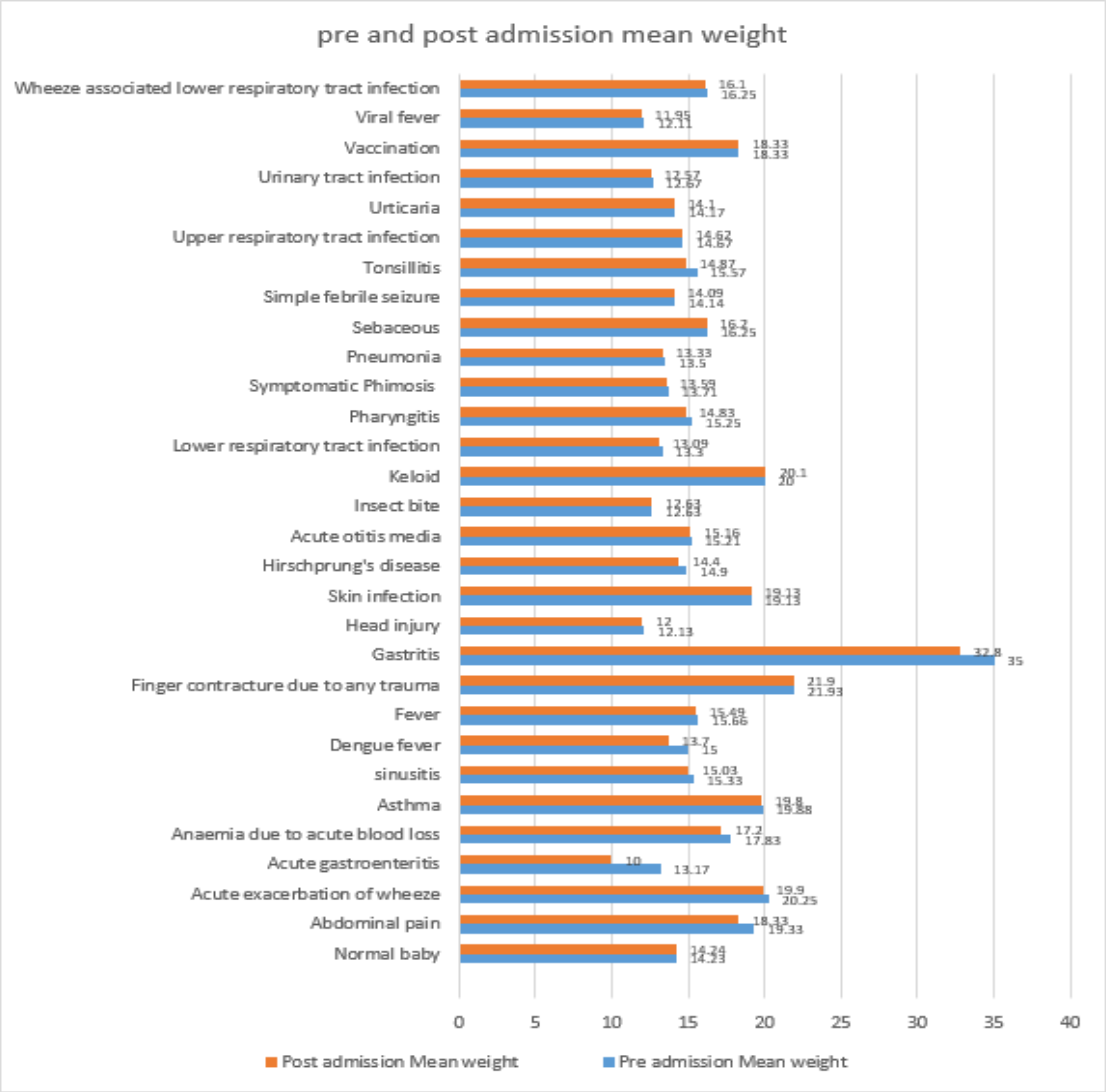
Table 2: Comparison of post admission weight between disease

	N	Post admission weight Mean ± SD	Mean difference	95% CI		P value
				Lower	Upper	
Normal baby	44	14.24 ± 8.46				
Abdominal pain	14	18.33 ± 11.68	-4.09	-12.1426	3.9459	0.316
Acute exacerbation of wheeze	3	19.90 ± 10.60	-5.67	-12.8335	1.5035	0.121
Acute gastroenteritis	4	10 ± 5.29	4.24	-3.8093	12.2793	0.301
Anaemia due to acute blood loss	3	17.20 ± 6.16	-2.97	-11.0093	5.0793	0.468
Asthma	3	19.80 ± 13.56	-5.57	-12.7335	1.6035	0.127
Sinusitis	4	15.03 ± 3.27	-.79833	-8.8426	7.2459	0.845
Dengue fever	3	13.70 ± 10.22	.53500	-5.3181	6.3881	0.857
Viral Fever	7	15.49 ± 7.44	-1.26	-5.3508	2.8342	0.545
Finger contracture due to any trauma	30	21.90 ± 13.72	-7.67	-15.7093	.3793	0.062
Gastritis	9	32.80 ± 0.42	-18.57	-28.1230	-9.0070	<0.001
Head injury	2	12.00 ± 2.58	2.24	-4.9335	9.4035	0.540
Skin infection	4	19.13 ± 13.74	-4.89	-12.9426	3.1459	0.231
Hirschprung's disease	3	14.40 ± 4.67	-0.17	-9.7230	9.3930	0.973
Acute otitis media	2	15.16 ± 9.23	-0.92	-6.7752	4.9309	0.756
Insect bite	7	12.63 ± 2.49	1.61	-5.5585	8.7785	0.658

Keloid	4	20.10 ± 2.69	-5.87	-15.4230	3.6930	0.228
Lower respirstory tract infection	2	13.09 ± 5.04	1.14	-2.6927	4.9708	0.559
Pharyngitis	4	14.83 ± 5.03	-0.59	-7.7585	6.5785	0.871
Symptomatic Phimosis	12	13.59 ± 5.24	0.65	-4.3292	5.6192	0.799
Pneumonia	8	13.33 ± 2.70	0.91	-4.6939	6.5139	0.749
Sebaceous	2	16.20 ± 5.37	-1.97	-11.5230	7.5930	0.686
Simple febrile seizure	11	14.09 ± 4.90	0.14	-4.9504	5.2385	0.956
Tonsillitis	7	14.87 ± 4.76	-0.64	-6.4895	5.2166	0.831
Upper respiratory tract infection	15	14.62 ± 5.60	-0.385	-5.0837	4.3137	0.872
Urticaria	3	14.10 ± 4.00	0.135	-7.9093	8.1793	0.974
Urinary tract infection	3	12.57 ± 5.87	1.67	-6.3759	9.7126	0.683
Vaccination	3	18.33 ± 5.86	-4.09	-12.1426	3.9459	0.316
Viral fever	28	11.95 ± 4.03	2.29	-1.8502	6.4273	0.277
Wheeze associated lower respiratory tract infection.	6	16.10 ± 4.61	-1.87	-8.0347	4.3047	0.552

Table 2 shows post admission weight of different acute illness with mean ± standard deviation of gastritis children is 32.80 ± 0.42, with significant P value of <0.001.





H.Pylori was isolated as the causative organism 4 out of 9 children (44%) of children who had acute gastritis, 3 had food poisoning and 2 had side effects due to amoxycillin+clavulanate, 1 had unknown reason.

The mean actual weight in kg, with the children is having gastritis with pre admission weight of 35 ± 0, post admission weight of 32.80 ± 0.42 between two weight was statistically significant (P value<0.001). There was a very strong positive correlation between Actual Weight in kg with the children with gastritis on pre admission and post admission.

DISCUSSIONS

Our study was conducted in the department of paediatrics, saveetha medical college and hospital between July 2023 and December 2023. The total of 250 children were included in this study.

Study done for evaluate the weight loss if any produced by the acute illness with normal children. In the Indian setting population, rapid paediatric estimation of weight among children 1 to 11 years old in emergency setting have not been evaluated. This study based on age group from 1 to 11years old. The gender of the respondents was

equally distributed in all age groups with almost 1:1 ratio and statistically comparable when grouped according to age.

Involuntary/unintentional weight loss is a common clinical problem that frequently is a sign of underlying illness. The most common identified causes of involuntary weight loss are malignancy, gastrointestinal disorders, and psychiatric conditions, acute illnesses like gastritis, fever, diarrhea; unknown etiologies represent a significant portion. Patients with normal history, physical examination, laboratory tests, and basic imaging studies are less likely to have a malignancy as the cause of involuntary weight loss; however, malignancy cannot be completely excluded [1]. This is similar to the present study in which except Acute gastritis (P<0.001) most of the parameters were clinically and statistically insignificant. (Table1)

Acute illnesses like Gastritis, asthma, acute gastroenteritis, fever will cause some minimal weight loss in children, but when comparing the weight loss of normal children with gastritis children having a strong positive relationship and showed statistically significant result when compared with other acute illnesses and there is no significant variation in differences in weight calculation by using other different methods like formula. Most common organism causing acute gastritis is H.Pylori infection[7]. In the present study we found the out of the 9 with acute gastritis 3 had H.Pylori infection and remaining 3 had food poisoning, 2 had side effects of drugs, 1 had unknown cause.

One of the most common causes of weight loss in acute illness is gastroenteritis. One of the leading causes of death in young children. In acute condition it will cause acute weight loss if will untreated it will lead to malnutrition, stunting and cognitive dysfunction [8]. In the present study acute gastritis children lost more weight than acute gastroenteritis. Acute gastroenteritis is usually managed with ORS resulting in lesser degree of weight loss, when compared with severe acute gastritis were retention of liquids consumed is less.

Be due to nosocomial infection or improper attention to nutrition. Especially children getting admit for any surgery, these were the major independent risk factors for weight loss in children. According to this literature 24.8% of children lose >2% of their body weights during the first week of hospitalization [9].

During emergencies quiet often clinicians rely on using formula to calculate the weight of the children, how much difference does it make at different standard deviation. For example, when we are using one method for calculating weight, if the -3 S.D is not making such differences in weight in drugs with lower window of safety, we can use -3 S.D weight difference itself. However, if that method is making significant differences in weight, then -1 S.D weight difference is used [10].

CONCLUSIONS

There is a significant difference in weight loss/gain when the children with the different acute disorder especially children with gastritis with respect to manual measurement of weight and in those situations where manual weight machine is not available then calculation by using other methods, were compared with normal baby (P <0.001). This factor will not act as confounding factors which can increase in variation when using with different methods.

References

1) Wong, Christopher J. 2014. Involuntary Weight Loss. Medical Clinics of North America, 98(3), 625–643. Doi: 10.1016/j.mcna.2014.01.012

2) Wells M, Goldstein L. The utility of pediatric age-based weight estimation formulas for emergency drug dose calculations in obese children. J Am Coll Emerg Physicians Open. 2020 May 22;1(5):947-954. doi: 10.1002/emp2.12099. PMID: 33145545; PMCID: PMC7593471.

3) Ana Kristina Lizo Garcia and Rebecca Abiog Castro Comparison of Actual and Estimated Body Weight Using Mid Upper Arm Circumference, Broselow Tape and Advanced Pediatric Life Support (APLS) Formula Among Children Age 1 to 12 Years Old, department of Pediatrics, University of Santo Tomas Hospital, Philippines 2017 Volume 7 DOI:10.4172/2161-0665.1000308

4) Lakhoo DP, Blake HA, Chersich MF, Nakstad B, Kovats S. The Effect of High and Low Ambient Temperature on Infant Health: A Systematic Review. Int J Environ Res Public Health. 2022 Jul 26;19(15):9109. doi: 10.3390/ijerph19159109. PMID: 35897477; PMCID: PMC9331681.

5) Amzat J, Razum O. Health, Disease, and Illness as Conceptual Tools. Medical Sociology in Africa. 2014 Feb 28:21–37. doi: 10.1007/978-3-319-03986-2_2. PMCID: PMC7120775.

6) Chen J, Kaur H, Jaques J, Rock Z, Dean CM, Lord RV, Preda V. Association of clinically significant weight loss with number of patient visits and months of attendance at an Australian multidisciplinary weight management clinic. Clin Obes. 2022 Jun;12(3):e12520. doi: 10.1111/cob.12520. Epub 2022 Mar 27. PMID: 35343053; PMCID: PMC9285583.

7) Săsăran MO, Meliţ LE, Mocan S, Ghiga DV, Dobru ED. Pediatric gastritis and its impact on hematologic parameters. Medicine (Baltimore). 2020 Aug 28;99(35):e21985. doi: 10.1097/MD.0000000000021985. PMID: 32871948; PMCID: PMC7458204

8) Mokomane M, Kasvosve I, de Melo E, Pernica JM, Goldfarb DM. The global problem of childhood diarrhoeal diseases: emerging strategies in prevention and management. Ther Adv Infect Dis. 2018 Jan;5(1):29-43. doi: 10.1177/2049936117744429. Epub 2017 Dec 7. PMID: 29344358; PMCID: PMC5761924.

9) Hwang EH, Park JH, Chun P, Lee YJ. Prevalence and Risk Factors for the Weight Loss during Hospitalization in Children: A Single Korean Children's Hospital Experience. Pediatr Gastroenterol Hepatol Nutr. 2016 Dec;19(4):269-275. doi: 10.5223/pghn.2016.19.4.269. Epub 2016 Dec 28. PMID: 28090472; PMCID: PMC5234416.

10) Roughead EE, Pratt NL. Impact on Drug Safety of Variation in Adherence: The Need for Routinely Reporting Measures of Dose Intensity in Medication Safety Studies Using Electronic Health Data. Drug Saf. 2015 Dec;38(12):1145-52. doi: 10.1007/s40264-015-0347-z. PMID: 26384490; PMCID: PMC4659848.