Original Article

DOI: 10.7860/JCDR/2023/62444.17654

Paediatrics Section

Clinical Profile and Antibiotic Sensitivity Pattern of Community Acquired Urinary Tract Infections in Children Attending a Tertiary Care Hospital in Assam, India

DULAL KALITA[1], FAHIMA NAZNIN ISLAM[2], MAHIBUR RAHMAN[3]

ABSTRACT

Introduction: Urinary Tract Infection (UTI) is a common problem in children. It is a very common cause of fever in children after gastrointestinal and respiratory diseases. Uropathogens causing community acquired UTI is increasing due to changing antibiotic sensitivity pattern over time. Appropriate choice of antibiotic is crucial to prevent complications related to UTI.

Aim: To study the clinical profile, risk factors, associated pathogen spectrum and their antibiotic sensitivity pattern in community acquired UTI.

Materials and Methods: A cross-sectional observational study with 150 sample size was conducted in the Department of Paediatrics, Gauhati Medical College and Hospital, Guwahati, Assam, India and was carried out among children (1 month to 12 years of age) with community acquired UTI, over a period of one year in the state of Assam. Fresh urine samples were collected by clean catch mid-stream method for toilet trained children and by transurethral catheterisation for infants and young children. It was followed by routine urine examination and culture and sensitivity testing to diagnose UTI. Descriptive statistics was used to describe the results. Proportion test was used for statistical evaluation.

Results: Majority of UTI cases were in the age group 1-5 years (57.3%) and there was female preponderance (59.3%). Fever was the most common presentation (55.3% cases) in the present study. This was followed by poor feeding (12.6%), lower abdominal pain (10.6%), failure to gain weight (10.6%). In urinalysis, 87 cases (58%) showed pyuria, 6 cases (4%) showed significant haematuria. Most prevalent uropathogens in the present study was *Escherichia coli* (*E.coli*) (66%cases), followed by *Enterococcus* sp. (16.7%), *Klebsiella* sp. (14%). *E.coli* had maximum sensitivity for nitrofurantoin (90.9%). It was followed by amikacin (80%), co-trimoxazole in 64.6% and gentamycin in 62.6% cases.

Conclusion: All fever cases in children should be screened to rule out UTI. All UTI cases should undergo culture and sensitivity testing to determine the sensitivity pattern.

Keywords: Antimicrobial agents, Paediatric infection, Renal scarring, Uropathogen

INTRODUCTION

Infection of the urinary tract system is a common problem in the community. The overall prevalence of UTI in the population is 11% [1]. UTI is common in children consisting 3% of all paediatric infections [2]. The prevalence of UTI among children visiting medical emergency is 5-14% [3,4]. Mostly children present with fever. Any children presenting with unexplained fever more than 38°C should be evaluated for UTI [5]. However, other clinical features for older children can be dysuria, pain abdomen, increase frequency of urine, but younger children most of the time present with non specific symptoms like vomiting, failure to thrive, jaundice etc. It is more common in male than female in neonatal and early infancy period, after that female preponderance is evident [5]. It is associated with several risk factors such as recent catheterisation, cleaning perineum from back to front, constipation, usage of tight underclothing, diaper usage, worm infestation, neurological abnormality, voluntary withholding of urine etc., [6]. Also, UTI can be associated with long-term complications like hypertension, impaired renal function, end-stage renal disease etc., especially when timely proper antibiotic has not been administered [7]. Hence, early diagnosis and early initiation of appropriate antibiotic therapy is necessary to prevent these complications. Again, the prevalence of the uropathogens causing UTI i.e., *E.coli*, *Klebsiella*, *Proteus*, *Enterococcus etc.,* and their sensitivity pattern to antibiotics vary among different geographic areas around the world. Moreover, emergence of antibiotic resistance among these uropathogens is a concern now-a-days [2]. Therefore, reviewing the sensitivity profile of the bacteria through scientific research from time to time is important to guide the treatment so that, authors can start empirical antibiotic therapy while waiting for urine culture and sensitivity report.

Till now, no data is available regarding clinical profile and antibiotic sensitivity pattern in community acquired UTI among children in Assam, however a few studies done on adult population are available for review [8,9]. Hence, considering all these facts, the present study was conducted with the objective to study the clinical profile, risk factors, associated pathogen spectrum and their antibiotic sensitivity pattern in community acquired UTI.

MATERIALS AND METHODS

This was a cross-sectional observational study which was conducted in the Department of Paediatrics, Gauhati Medical College and Hospital, Guwahati, Assam, India, from 1st May 2020 to 30th April 2021. The proposed format was passed by the ethics committee of Gauhati Medical College and Hospital. Ethical approval number given was 190/2007/pt-11/Dec- 2019/03. Informed written consent was taken from the parents of the children enrolled in the study in their native language.

Sample size calculation: Considering the prevalence of UTI among children visiting healthcare facility to be 10%, the present study was conducted with sample size of 150 patients [7,10,11]. Sample size was calculated using Danial's formula: Sample size, $n=Z^2p(1-p)/d^2$.

Inclusion criteria: Patient in the age group of one month to 12 years attending Paediatric Emergency and Outpatient service

with suspicion for urinary infection were worked up and only the urine culture positive cases were enrolled in the study.

Exclusion criteria: Patients were excluded if: (a) they had history of antibiotic usage in last one week; (b) acquired infection in the hospital after 48 hours of hospitalisation for other reason [12]; (c) with known congenital genitourinary anomalies; and (d) recurrent UTI. A total of 150 patients were included in the study and 60 patients were excluded.

Study Procedure

History was taken enquiring age of the patient, presenting complaint with duration, past illness with urinary complaints and fever, any surgical intervention done for urinary tract abnormality, whether there is history of constipation, pin worm infestation etc. Physical examination was performed to check the vitals of the child and for preliminary systemic survey. Data was collected in pretested proforma.

Fresh urine samples were collected by clean catch mid-stream method for toilet trained children and by transurethral catheterisation for infants and young children. It was followed by routine urine examination and culture and sensitivity testing to diagnose UTI. Total leucocyte count was done in all cases. Additional tests like Ultrasonography of kidney-urinary bladder and Micturating Cystourethrogram (MCU) were done as per the need of the patient. In routine examination of urine >5 pus cells/HPF in centrifuged sample were considered for pyuria [13] and >5 red blood cells/HPF for haematuria [14]. Urine culture was done using CLED agar plate and sensitivity was checked using Vitek 2 Compact, Identification and Antibiotic Sensitivity Testing System. In the present study, for Midstream clean catch urine sample, more than or equal to 10^5 CFU/mL was considered significant for infection and for urethral catheterisation sample, more than or equal to 5×10^4 CFU/mL was considered significant to have infection [14].

STATISTICAL ANALYSIS

The data collected from the patients were formatted into Microsoft excel sheets to generate master chart, tables, and graphs. Diagrammatic representations were used to depict significant clinical data from patients with culture proven UTI. Descriptive statistics was used to describe the results. Proportion test was used for statistical evaluation. A p-value less than 0.05 was considered as statistically significant at 5% level of significance and p-values calculated using Chi-square test. SPSS software version 28 was used to analyse the data.

RESULTS

The study was conducted with sample size of 150 from age one month to 12 years. Out of that 67 were male and 83 female. Majority of the cases were in the 1-5 year age group (57.3%). In infancy, 20.7% cases were seen [Table/Fig-1].

Age group (in years)	No. of cases	Percentage (%)
Below 1	31	20.7
1-5	86	57.3
>5-10	28	18.7
>10	5	3.3
Total	150	100

[Table/Fig-1]: Showing age-wise distribution of the cases (N=150).

Regarding gender distribution, it was found that female 89 cases (59.3%) and male 61 cases (40.6%) in the present study. Fever was the most common presentation (55.3% cases) in the present study. This was followed by poor feeding (12.6%), lower abdominal pain (10.6%), failure to gain weight (10.6%), increase frequency of micturition (10.7%), vomiting (10%), burning micturition (6.7%). The present study found maximum number of fever cases presented in the age group of 1-5 years (60 cases, 40%) and this was statistically significant (p<0.001). Lower abdominal pain was the presenting symptom of UTI, mostly in the age group of 5-10 years (13 cases, 8.6%) (p-value=0.12). Failure to gain weight was most common presenting feature in infancy (12 cases, 8%). Burning micturition was the clinical presentation in children with UTI in more than five years age group in the present study. Total of 6.7% cases presented with this symptom in the present study. Total of 10.6% cases in the study had increase frequency of micturition as a clinical feature. Maximum children with increased frequency of micturition (10 out of 16 cases, 6.7%) were found in the age group 1-5 years [Table/Fig-2].

Clinical features	No. of cases	Percentage (%)
Fever	83	55.3 (p<0.001) (Chi-square test)
Pain abdomen	16	10.6
Vomiting	15	10
Failure to gain weight	16	10.6
Poor feeding	19	12.6
Burning micturition	10	6.7
Hazy urine	2	1.3
Irritability	3	2
Increased frequency of micturition	16	10.7
Loose stool	1	1
Perineal Itching	1	1

[Table/Fig-2]: Showing distribution of the cases as per the presenting complaints of the patients (N=150).

Out of 150, 4.7% cases with UTI were associated with diaper rash, 2% were associated with constipation and 2% with pin worm infection [Table/Fig-3].

Risk factors	No. of cases	Percentage (%)
Diaper rash	7	4.7
Constipation	3	2
Pin worm infestation	3	2

[Table/Fig-3]: Shows the risk factors associated with Urinary Tract Infection (UTI) (N=150).

In the present study, most prevalent uropathogen was *E.coli* (66%), followed by *Enterococcus* sp. (16.7%), *Klebsiella* sp. (14%). Least commonly found organisms were *Candida* 2 (1.3%) and *Morganella* 3 (2%) as revealed from the urine culture studies [Table/Fig-4]. *E.coli* was the most common organism in all age group and most children with *E.coli* infection were presented with fever (51.5%), followed by poor feeding (15.2%), failure to gain weight (11.1%), pain abdomen (10.1%), increased frequency of micturition (8.1%), burning micturition (7%).

It was seen that, *E.coli* had maximum sensitivity for nitrofurantoin (90.9%). It was followed by amikacin (80%). It was sensitive to co-trimoxazole in 64.6% cases, gentamycin in 62.6% cases, tigecycline in 56.6% cases, to meropenem 54.4% cases, piperacillin in 53.5% cases. It shows *Enterococcus* had highest sensitivity for linezolid (92%) and vancomycin (92%). It is followed by its sensitivity for teicoplanin (88%), tetracycline (84%), tigecycline (76%). *Klebsiella* was sensitive to amikacin (76.2%), aztreonam (76.2%) and colistin (76.2%) in maximum number cases [Table/Fig-5].

Uropathogen	No. of cases	Percentage (%)
E.coli	99	66
Enterococcus	25	16.7
Klebsiella	21	14
Candida	2	1.3
Morganella	3	2
Total	150	100

[Table/Fig-4]: Represents the prevalence of different uropathogens among the cases (N=150).

Antibiotics	*E.coli* (n=99)	*Enterococcus* (n=25)	*Klebsiella* (n=21)
	Sensitive cases	Sensitive cases	Sensitive cases
Amikacin	80 (80.8)	---	16 (76.2)
Amoxiclav	46 (46.5)	---	--
Ampicillin	--	4 (16)	---
Aztreonam	---	---	16 (76.2)
Cefotaxime	43 (43.4)	---	7 (33.3)
Ceftriaxone	27 (27.3)	---	---
Ceftazidime	--	--	5.23.8)
Ciprofloxacin	44 (44.4)	2 (8)	--
Colistin	37 (37.4)	--	16 (76.2)
Doxycycline	--	2 (8)	--
Fosfomycin	---	2 (8)	--
Gentamycin	62 (62.6)	2 (8)	12 (57.1)
Imipenem	37 (37.4)	--	5 (23.8)
Levofloxacin	7 (7)	--	--
Linezolid	----	23 (92)	--
Meropenem	54 (54.4)	--	12 (57.2)
Nitrofurantoin	90 (90.9)	6 (24)	--
Norfloxacin	27 (27.3)	--	--
piperacillin	53 (53.5)	--	--
Tigecycline	56 (56.6)	19 (76)	--
Teicoplanin	--	22 (88)	--
Tetracycline	--	21 (84)	--
Co-trimoxazole	64 (64.6)	--	12 (57.1)
Vancomycin	--	23 (92)	--

[Table/Fig-5]: Shows the antibiotic sensitivity pattern of *E.coli* isolated from the culture.

Further, in the present study total 83 out of 150 (55.3%) cases presented with leucocytosis and maximum number was in the age group of 1-5 years (51 cases) [Table/Fig-6].

Age group (in years)	No. of case	Percentage (%)
Below 1	13	8.6
1-5	51	34
>5-10	15	10
>10	4	2.6
Total (N=150)	83	55.3

[Table/Fig-6]: Cases with leucocytosis in Urinary Tract Infection (UTI) (N=150).

In urinalysis, 87 cases (58%) showed pyuria, 6 cases (4%) showed significant haematuria and significant urine albumin present in 24% cases. Again, in ultrasonographic evaluation of kidney-urinary bladder in the present study, 4 out of 150 (2.7%) cases were found to have posterior urethra valve, 13 out of 150 (8.6%) cases had cystitis.

DISCUSSION

The present study determined the distribution and antibiotic susceptibility pattern of microbial species isolated from paediatric patients with community acquired UTI from a tertiary care centre along with clinical profile. In the present study, maximum prevalence of UTI was found in the age group of 1-5 years. Other workers like Patel AH et al., Sharma A et al., from different parts of the country found similar picture [15,16]. Patel AH et al., had 41.07% cases and Sharma A et al., had 50% cases in this age group of 1-5 years [15,16]. On the other hand, in the study by Gupta P et al., maximum cases found to be in infants (56.4%) [17].

The present study showed there was female preponderance among the cases (55.3%) and this was concordant with the findings in the studies reviewed. Patel AH et al., found 57.1% female in their study, Bhonsle K et al., found 54% female, Singh SD and Madhup SK found 67.4% female cases among the cases positive for UTI [15,18,19]. This is because of shorter urethra, close approximation of urethral opening and anal canal in female, which makes them susceptible to contamination with faecal flora and ascent of faecal flora into the urinary tract.

Among clinical features, fever was most common in the present study (55%), and others are pain abdomen, vomiting, failure to gain weight, burning micturition, increase frequency of micturition, poor feeding. Different researchers from different parts of the country also found fever as the most common clinical presentation of UTI in children. Patel AH et al., had 69.6% patients presenting with fever, Singh SD and Madhup SK had 74.8% cases, Badhan R et al., had 41.7% [15,19,20].

In the present study, 4.7% cases with UTI were associated with diaper rash, 2% were associated with constipation and 2% with pin worm infection. Malla KK et al., found constipation in 7.1% cases with UTI [21]. Patel AH et al., found constipation in 5.4% cases with UTI [15]. Regarding routine urine examination this study showed 58% cases of pyuria. This was comparable with findings of Hanna-Wakim RH et al., who showed in their study 60.1% cases had pyuria [22]. However, in the study done by Sriram G et al., found that 13.5% cases had pyuria [23].

Again, in the present study *E.coli* was the most common uropathogen associated with UTI (66%), followed by *Enterococcus* and *Klebsiella*. This finding was supported by finding from other studies reviewed. Bhonsle et al., had 60.3% cases and Badhan R et al., had 42.3% infections with *E.coli* [18,20]. Patel AH et al., had 58.9% cases, Gupta P et al., had 68.3% cases, Sriram G et al., had 54.5% cases and Kaur N et al., had 45.4% cases [15,17,23,24]. Among the gram-positive organism *Enterococcus* was found to a causative agent in the present study (16.7%) cases.

Also, the present study observed that sensitivity of *E.coli* to nitrofurantoin is 90.9%. This comparable to the findings in Patel AH et al., (100%), Gupta P et al., (100%), Badhan R et al., (94%), Kaur N et al., (95%) [15,17,20,24]. It was found in this study that sensitivity of *E.coli* to amikacin was in 80.8% cases. This finding is comparable to the studies done by, Patel AH et al., (90.9%), Gupta P et al., (90.7%) and Patwardhan V et al., (89.8%). Sensitivity of *E.coli* to amoxiclav was 46.5% in this study. This value is near to the values found in the studies done by Patel AH et al., (48.5%) and Patwardhan V et al., (51.8%) [15,25]; whereas Kaur N et al., recorded only 29% cases to be sensitive to amoxiclav [24]. Also, found in this study that *E.coli* was sensitive to Trimethoprim sulfamethoxazole in 64.6% cases, gentamycin in 62.6% cases, tigecycline in 56.6% cases, meropenem in 54.4% cases, piperacillin in 53.5% cases. The [Table/Fig-7] shows comparative sensitivity of most common organism causing UTI in children i.e., *E.coli*, from different studies reviewed [15,17,20,24,25].

The present study showed *Klebsiella* were most sensitive to amikacin (76.2%). Patel AH et al., Badhan R et al., were also reported comparable values, 77.8% and 71%, respectively [15,20].

Antibiotics	Present study Assam	Patwardhan V et al., (2017) [25] North India	Badhan R et al., (2016) [20]	Patel AH et al., (2015) [15] Ahmedabad, India	Gupta P et al., (2015) [17] Puducherry, South India	Kaur N et al., (2012) [24] New Delhi
Nitrofurantoin	90.9	56.6	94	100	100	95
Amoxiclav	46.5	51.8	-	48.5		29
Amikacin	80.8	89.8	58	90.9	90.7	52
Cefotaxime	43.4	24.8	74	27.3	-	27

Norfloxacin	27.3	40.7	18	33.3	-	24
Gentamycin	62.6	84	-	63.3	47.4	37
Ceftriaxone	27.3	-	-	27.3	25.8	-
Meropenem	54.4	-	-	-	78.3	100
Cotrimoxazole	64.6	11.9	33	24.2	-	25
Piperacillin	53.5	-	-	87.9	-	95

[Table/Fig-7]: Shows the antibiotic sensitivity of *E.coli* to different antibiotics in different studies [15,17,20,24,25].

However, Gupta P et al., had 53.3% cases and Kaur N et al., had 59% cases of *Klebsiella* with sensitive to amikacin [17,24].

It was also found from the present study that *Enterococcus* had maximum sensitivity for Linezolid (92%) and vancomycin (92%). However, Gupta P et al., found in their study that *Enterococcus* was 96.8% sensitive to meropenem [17]. Kaur N et al., from their study found that *Enterococcus* was most sensitive to Nitrofurantoin [24]. From the present study, the authors have seen that most of the uropathogens are not sensitive to commonly used oral antibiotics like co-amoxiclav, co-trimoxazole. *Klebsiella* is sensitive to no oral antibiotics and *Enterococcus* is sensitive to linezolid only, among oral antibiotics.

Limitation(s)

One of the limitations of the present study was that, it was an observational study. Moreover, it was a small study and sample size was small. Further, the study was conducted in a short period.

CONCLUSION(S)

All fever cases in children should be screened to rule out UTI. High suspicion should be kept in case of infants, to detect UTI with the aim to prevent urosepsis and renal scarring. Improper and overzealous use of antibiotic should be stopped to prevent emergence of new resistant strains of bacteria. Also, over the counter selling of antibiotics should be stopped. Regional surveillance program can be conducted periodically in each region to know the prevalent uropathogens pattern and their change in antibiotic susceptibility pattern in the community level.

REFERENCES

[1] Medina M, Castillo-Pino E. An introduction to the epidemiology and burden of urinary trac infections. Ther Adv Urol. 2019;11:03-07.
[2] Kalal BS, Patel R. Microbiological and antimicrobial profile of urinary tract infection in children from a teaching hospital in South India. Journal of Pediatric Infection (Çocuk Enfeksiyon Dergisi). 2017(11):19-22.
[3] Almofarreh M, Alowaa Z, Junainah E, Alshahrani N, Alharbi M, Alkhalifah W, et al. Prevalence of urinary tract infection among children. Int J Contemp Pediatr. 2018;5(6):2356-59.
[4] Shaikh N, Morone NE, Bost JE, Farrell MH. Prevalence of urinary tract infection in childhood: A meta-analysis. Pediatr Infect Dis J. 2008;27(4):302-08.
[5] Okarska-Napierała M, Wasilewska A, Kuchar E. Urinary tract infection in children: Diagnosis, treatment, imaging-Comparison of current guidelines. Journal of Pediatric Urology. 2017;13(6):567-73.
[6] Kavitha J, Aravind MA, Jayachandran G, Priya S. Risk factors for urinary tract infection in pediatric patients. Int J Contemp Pediatr. 2017;5(1):184-89.
[7] Hellerstein S. The long-term consequences of urinary tract infections: A historic and contemporary perspective. Pediatric annals. 1999;28(11):695-99.
[8] Sharma I, Paul D. Prevalence of community acquired urinary tract infections in Silchar Medical College, Assam, India and its antimicrobial susceptibility profile. Indian Journal of Medical Sciences. 2012;66(11/12):273.
[9] Paul D, Anto N, Bhardwaj M, Prendiville A, Elangovan R, Bachmann TT, et al. Antimicrobial resistance in patients with suspected urinary tract infections in primary care in Assam, India. JAC-Antimicrobial Resistance. 2021;3(4):dlab164.
[10] Freedman AL, Urologic Diseases in America Project. Urologic diseases in North America Project:trends in resource utilization for urinary tract infections in children. The Journal of Urology. 2005;173(3):949-54.
[11] Alper BS, Curry SH. Urinary tract infection in children. American Family Physician. 2005;72(12):2483-88.
[12] World Health Organization. Prevention of hospital-acquired infections: A practical guide. World Health Organization; 2002.
[13] Vijayakumar M. Revised statement on management of urinary tract infections. Indian Pediatr. 2011;48:709-17.
[14] Kliegman R, Stanton B, St Geme JW, Schor NF, Behrman RE, Nelson WE. Nelson Textbook of Pediatrics. Edition 21 ed. Philadelphia PA: Elsevier; 2020.
[15] Patel AH, Bhavsar RH, Trivedi P, Mehta SR. Urinary tract infections in children: Clinical profile, bacteriology and antibiotic sensitivity pattern. GCSMC J Med Sci. 2015;4(11):75-82.
[16] Sharma A, Shrestha S, Upadhyay S, Rijal P. Clinical and bacteriological profile of urinary tract infection in children at Nepal Medical College Teaching Hospital. Nepal Med Coll J. 2011;13(1):24-26.
[17] Gupta P, Mandal J, Krishnamurthy S, Barathi D, Pandit N. Profile of urinary tract infections in Paediatric patients. Indian J Med Res. 2015;141(4):473.
[18] Bhonsle K, Vyas A, Vyas H, Ramchandani A, Hemwani K. Prevalence, identification and frequency of uropathogens causing urinary tract infection in children in Ujjain (M.P.). Indian J Microbiol Res. 2022;9(2):131-34.
[19] Singh SD, Madhup SK. Clinical profile and antibiotics sensitivity in childhood urinary tract infection at Dhulikhel Hospital. Kathmandu University Medical Journal. 2013;11(4):319-24.
[20] Badhan R, Singh DV, Badhan LR, Kaur A. Evaluation of bacteriological profile and antibiotic sensitivity patterns in children with urinary tract infection: A prospective study from a tertiary care center. Indian Journal of Urology: IJU: Journal of the Urological Society of India. 2016;32(1):50.
[21] Malla KK, Sarma MS, Malla T, Thapalial A. Clinical profile, bacterial isolates and antibiotic susceptibility patterns in urinary tract infection in children-hospital based study. Journal of Nepal Paediatric Society. 2008;28(2):52-61.
[22] Hanna-Wakim RH, Ghanem ST, El Helou MW, Khafaja SA, Shaker RA, Hassan SA, et al. Epidemiology and characteristics of urinary tract infections in children and adolescents. Frontiers in Cellular and Infection Microbiology. 2015;5:45.
[23] Sriram G, Satyanarayana A, Naik DR, Chandra TJ. Prevalence of urinary tract infection in febrile children between one to five years of age. Int J Pediatr Res. 2019;6(10):542-46.
[24] Kaur N, Sharma S, Malhotra S, Madan P, Hans C. Urinary tract infection: Aetiology and antimicrobial resistance pattern in infants from a tertiary care hospital in northern India. J Clin Diagn Res. 2014;8(10):DC01.
[25] Patwardhan V, Kumar D, Goel V, Singh S. Changing prevalence and antibiotic drug resistance pattern of pathogens seen in community-acquired pediatric urinary tract infections at a tertiary care hospital of North India. J Lab Physicians. 2017;9(04):264-68.

PARTICULARS OF CONTRIBUTORS:
1. Associate Professor, Department of Paediatrics, Gauhati Medical College and Hospital, Guwahati, Assam, India.
2. Postgraduate Trainee, Department of Paediatrics, Gauhati Medical College and Hospital, Guwahati, Assam, India.
3. Assistant Professor, Department of Paediatrics, Gauhati Medical College and Hospital, Guwahati, Assam, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dulal Kalita,
Associate Professor, Department of Paediatrics, Gauhati Medical College and Hospital, P.O. Indrapur, Guwahati-781032, Assam, India.
E-mail: dulalkalita68@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Dec 23, 2022
- Manual Googling: Jan 09, 2023
- iThenticate Software: Jan 31, 2023 (10%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Dec 22, 2022**
Date of Peer Review: **Jan 06, 2023**
Date of Acceptance: **Feb 09, 2023**
Date of Publishing: **Mar 01, 2023**