ISSN (P) : 2589-9120 / (O) : 2589-9139
PubMed-National Library of Medicine - ID: 101773527

International Journal of Medical Science and Applied Research (IJMSAR)

Available Online at: https://www.ijmsar.com

Volume – 7, Issue – 5, September – 2024, Page No. : 08 – 17

The Study On Clinical Profile of Syncope in Children

[1]Dr. P. Devi Prasanna, [2]Dr. V. Esther Nissy Nirmal, [3]Dr. A. Naveen Kumar Reddy

[1]Post Graduate, Dept. of Paediatrics, Viswabharathi medical college and Hospital, Kurnool, Andhra Pradesh, India

[2]Assistant Professor, Dept. of Paediatrics, Akash Institute of Medical Sciences and Research Centre, Devanahalli, Karnataka, India

[3]Professor and HOD, Dept. of Paediatrics, Viswabharathi Medical College, Kurnool, Andhra Pradesh, India

Citation of this Article: Dr. P. Devi Prasanna, Dr. V. Esther Nissy Nirmal, Dr. A. Naveen Kumar Reddy, "The Study On Clinical Profile of Syncope in Children'' IJMSAR – September – 2024, Vol. – 7, Issue - 5, Page No. 08-17.

Corresponding Author: Dr. P. Devi Prasanna, Post Graduate, Dept. of Paediatrics, Viswabharathi medical college and Hospital, Kurnool, Andhra Pradesh, India

Type of Publication: Original Research Article

Conflicts of Interest: Nil

ABSTRACT

Introduction

Syncope is defined as abrupt and transient loss of consciousness associated with loss of postural tone, followed by rapid recovery. There are three groups of causes, autonomic instability which is usually benign and more common, cardiac cause which are serious but less common and others including neurological which are rare. The diagnostic yield can be increased if the pediatrician meticulously takes the history and performs the clinical examination.

Materials and Methods

This is a prospective observational study in children of age group 6 months to 12years presenting with syncope for the first time in the OPD from January 2023 to January 2024.

Results

Among 120 cases, majority were coming under the age group of 6 months to 12 years (p = 0.001). The mean age of presentation of syncope was 9.5yrs. Female: male ratio was 1.5:1 (p = 0.105). Females were more commonly affected than males. Vasovagal syncope was the most common cause which accounts for 40% of cases (n=48). Vasovagal syncope was more common in the morning time. Breath holding spells were more common in children of age group 6mon to 3yrs (90%) & majority was cyanotic (80%). Family history was present in 25% of patients with BHS. Anemia of mild grade was associated with majority of cases with BHS. (76.5%) with statistical significance (p = 0.001).

Conclusions

Syncope is a common clinical presentation in the pediatric age group. While benign neuro- cardiogenic syncope is the commonest cause, cardiac causes contribute to a small but important subset of these patients. A detailed history and physical examination along with an ECG is adequate to identify all cases of cardiac syncope which require further evaluation.

INTRODUCTION

- The Greek word "synkoptein" is the derivation of the word syncope, meaning to cut short.
- Syncope is defined as an abrupt and transient loss of consciousness associated with loss of postural tone, typically followed by a rapid recovery.
- The underlying event in all types of syncope is transient cerebral hypo perfusion.
- Syncope is a common clinical problem in the pediatric age group, with most estimates quoting that 15% of the population would have experienced at least one episode by the age of 18 years.
- The vast majority of syncope in this age group can be attributed to autonomic instability, which is usually benign.
- However, a small and significant group of children (5-10%) may experience symptoms due to a cardiac cause.
- The causes of syncope can be broadly classified into three categories:

  1) Autonomic Syncope,

  2) Cardiac Syncope,

  3) Others, including neurological causes.

❖ **Autonomic syncope**

- Autonomic Syncope accounts for approximately 80% of pediatric cases with syncope[3].
- The commonest and best understood of these categories is the 'Neuro-cardiogenic syncope (NCS)' also referred as "common faint."
- The typical NCS episode has three components a prodrome which almost always precedes the loss of consciousness, which in turn is followed by a prompt and usually complete recovery.
- The pathophysiology of NCS is best explained by the Bezold-Jarisch reflex- a paradoxical reflex where pooling of blood in the veins results in both a catecholaminergic surge as well as increased vagal tone.
- The common precipitants in children include hunger, lack of sleep, dehydration, anemia, and viral illnesses, while typical triggers include a sudden change of posture, prolonged upright posture, and emotional stress.

❖ **Cardiac syncope**

- Syncope can be attributed to a cardiovascular cause in approximately 10% of cases[3].
- The hallmark of cardiovascular syncope is syncope at the peak of exertion. The cardiovascular causes of syncope can be divided into arrhythmias, outflow tract obstructions, and coronary problems.
- Outflow tract obstructions (of both the left and right ventricle) are usually fixed mechanical causes. During exercise, the heart cannot increase the cardiac output to meet the increased requirements, which results in cerebral hypo perfusion.

- The inherited arrhythmias include Long QT syndrome (LQTS), Catecholaminergic polymorphic ventricular tachycardia (CPVT), and Brugada syndrome. When there is clinical suspicion, an urgent referral to a pediatric cardiologist is indicated to ensure that the diagnosis is not missed.
- Syncope due to coronary causes are Kawasaki disease (KD), Anomalous origin of the coronary artery from an unusual location in the aorta (AAOCA) or, from the pulmonary artery (ALCAPA).

❖ **Non-cardiac causes**

- Non-cardiac causes account for less than 10% of syncope.
- These include neurogenic causes like seizures. Cerebral hypoxia may result in convulsive movements even during NCS, which is referred to as a convulsive syncope.
- Few clues to differentiate from epilepsy can be discerned from a careful history:

1. Prodrome and presyncope typical of convulsive syncope are
2. Tongue biting is very rare in convulsive syncope and, if present, is usually at the tip of the tongue, unlike the sides during epilepsy
3. Incontinence typically does not occur in convulsive syncope
4. Convulsive movements - are usually pleomorphic in convulsive syncope, whereas they are rhythmic and uniform in seizures.
5. Duration The episode almost always lasts less than a minute in convulsive syncope

It is essential to rule out malingering and other psychogenic causes of seizures, especially in adolescents.

Key elements in history

• Time of the event
• Activity leading to the event
• Associated symptoms
• Posture at the time of the event
• Family history

The red flag signs which should raise suspicion about a cardiovascular cause of syncope

• Syncope on exertion
• Syncope without prodrome
• Syncope in the supine position
• Known cardiac disease
• Known case of Kawasaki disease
• Sudden death in family members (<50years)
• Cardiomyopathy members in family
• Known history suggestive of arrhythmias Death in other family members due to drowning, syncope after auditory stimulus

Physical Examination

- The physical examination in syncope should include vital cardiac signs, i.e., heart rate, pulse volume, blood pressure, and oxygen saturation (SpO2).
- When the clinical suspicion is NCS, it is essential to look for orthostatic changes in the heart rate and blood pressure.
- The heart rate is much lower than normal in complete heart block, while a low volume, slow rising pulse suggests significant left ventricular outflow tract obstruction.
- A harsh ejection murmur at the heart base should raise the suspicion of outflow

obstruction, while a loud pulmonary component of the second heart sound (P2) suggests pulmonary hypertension.

- The clinical examination is usually normal in children with inherited arrhythmias.
- A rapid neurological examination is essential and should focus on possible associations with epilepsy, such as neuro-cutaneous markers, signs of raised intracranial tension, and focal neurological deficits.
- An ECG should be performed in all children in whom a diagnosis of NCS cannot be reliably established at the end of history and physical examination.
- CT has the lowest diagnostic yield and can be replaced by a good focused neurological examination.
- Unnecessary investigations can be avoided, and diagnostic yield can be increased if the pediatrician meticulously takes history and performs the clinical examination.

AIMS AND OBJECTIVES

To study the etiological factor and clinical profile of syncope in children.

MATERIALS AND METHODS

STUDY PLACE: Department of Pediatrics, Viswa Bharathi Medical College, Kurnool

STUDY DESIGN: observational study Prospective

STUDY PERIOD: January 2023 to January 2024

INCLUSION CRITERIA

Children in the age group of 6 months to 12years presenting with syncope for the first time in the OPD.

EXCLUSION CRITERIA

- Less than 6months of age.
- Known developmental delay/ Intellectual Disability
- Seizure disorder.
- Children who were already evaluated and on treatment for syncope.

METHODOLOGY

- All the children fulfilling inclusion & exclusion criteria of about 120 cases attending the Pediatric outpatient department were selected for our study. Informed and written consent was obtained.
- Lower limit of 6 months was selected because it was expected that breath holding spells were peak after the age of 6months. Age of onset, gender, etiology, precipitating factors, associated symptoms, family history were recorded. Distribution of anemia was also studied.
- The general clinical, cardiovascular, neurological examination were done and laboratory tests including blood counts, peripheral smear study, blood sugar, electrolytes, ECG, X-ray chest were done for all patients whereas 2D-Echo, EEG, CT brain were taken if needed.

All the details were analyzed using appropriate statistical methods.

RESULTS

In this study conducted between January 2023 and January 2024, about 120 cases were included.

Table 1: Age wise distribution of syncope

Age	N	%
6 Months – 3 Years	36	30%
3 Years – 6Years	8	6.7%
6 Years – 9 Years	19	15.8%
9 Years – 12 Years	57	47.5%

Syncope in children was common in the age group of 9 to 12 years (47.5%), followed by 6 months to 3 years.

Fig1: Age wise distribution of syncope

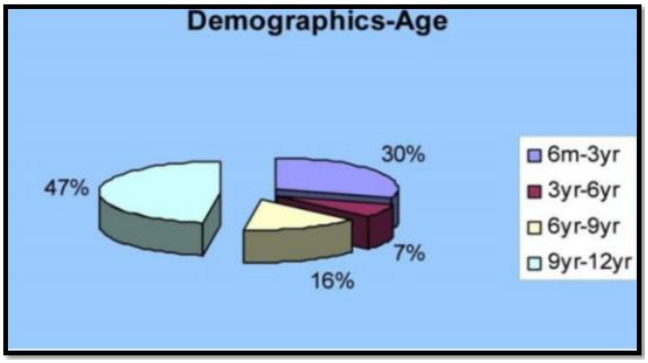

Table 2: Gender wise Distribution of Syncope

Gender	N	%
Male	47	39.2
Female	73	60.5

About 60% of children were female.

Table 3: Etiology of Syncope in Children

Types of syncope	N	%
Vasovagal	40	40
Breath Holding Spells	48	33.3
Cardiac	8	6.7
Orthostatic Hypotension	4	3
Hyperventilation	2	1.7
Migraine	1	0.8
Other	17	14.5
Total	120	100

The table reveals that vasovagal syncope was the most common type accounting for 40%. Breath holding spells was the second most common cause accounting for 33.3%.

Fig 2: Etiology of syncope

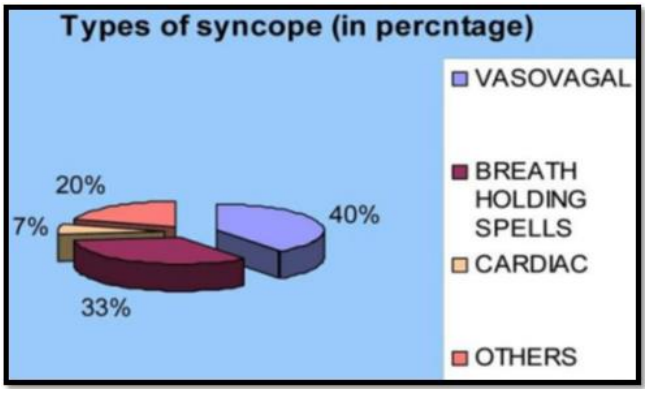

Table 4: Age & Gender wise Distribution of Vasovagal Syncope

		N	%
AGE	6 Months – 3 Years	Nil	-
	3 Years – 6Years	2	4.1
	6 Years – 9 Years	9	18.8
	9 Years – 12 Years	37	77.1
	Total	48	100
SEX	Male	16	33.3
	Female	32	66.7
	Total	48	100

Majority of children belonged to the age group of 9 to 12 years accounting for 77.1%, common in females (66.7%).

Table 5: Precipitating Factors in Vasovagal Syncope

Factors	N	%
Hot Sun	23	47.9
Crowded Places	19	39.6
Blood Drawing /Sight Of Blood	3	6.25
Fasting	3	6.25
Total	48	100

Standing in the hot sun is the most common precipitating factor for vasovagal syncope (47.9%) followed by crowded places (39.6%).

Table 6: Diurnal Variation in Vasovagal Syncope

Timing	N	%
Morning	29	60.41
Afternoon	3	6.25
Evening	16	33.34
Total	48	100

Majority suffered of vasovagal syncope in the morning (60.41%).

Table 7: Age and Gender Wise Distribution in Breath holding Spells

		N	%
AGE	6 Months – 3 Years	36	90
	3 Years – 6Years	4	10
	6 Years – 9 Years	Nil	-
	9 Years – 12 Years	Nil	-
	Total	40	100
SEX	Male	21	52.5
	Female	19	47.5
	Total	40	100

In breath holding spells, 90% of the children (n=36) belonged to the age group of 6 months to 3 years and majority were male (52.5%). Only 4 children were under the age group of 3 years to 6 years, this accounting for 10%.

Table 8: Types of Breath holding Spells

Types	N	%
Cyanotic	32	80
Pallid	8	20
Total	40	100

Cyanotic BHS were more common compared to pallid BHS. 32 patients (80%) fall under cyanotic BHS

Fig. 3: Types of breath holding spells

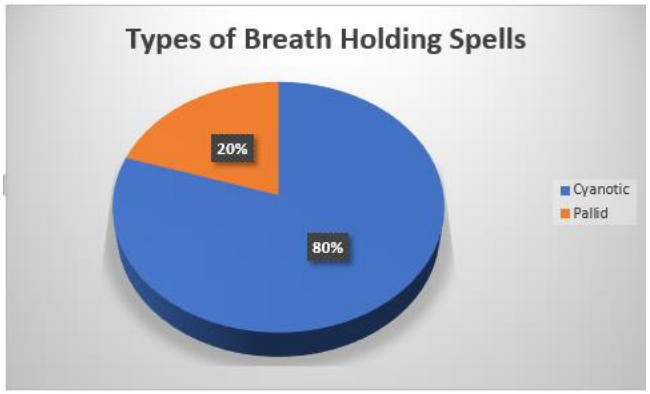

Table 9: Association of Family History Family History

Family History	N	%
Positive	10	25
Negative	30	75
Total	40	100

Only 10 (25%) patients had family history of breath holding spells.

Table 10: Distribution of Anemia in Various Syncope

Causes	N	Anemia (No of Cases)	No. Anemia	%
Breath Holding Spells	40	34	6	85
Vasovagal	48	29	19	60.4
Cardiac	8	3	5	37.5
Others	24	12	12	50

Out of 120 cases, 78 children were anemic (65%), 42 children (35%) were having their Hb in the normal range.

Table 11: Severity of Anemia in Breath holding Spells

Hb	N	%
Mild (7-10)	26	76.5
Moderate (5-7)	7	20.5
Severe(<5)	1	3
Total	34	100

Among the anemic children in BHS, 26 (76.5%) had mild anemia, 7 (20.5%) had moderate anemia, 1 (3%) had severe anemia.

DISCUSSION

- The percentage of syncope in each age group was compared with Driscoll et al (1997).
- It was clear that syncope was common as the age increases because of increased incidence of vasovagal syncope with increasing age and it was statistically significant. On comparing our study with that of Linzer et al (52.7%), it was clear that females were commonly affected by syncope.
- On comparing our study, with that of Steinberg et al, Zhang et al, vasovagal syncope was the most common cause followed by Breath holding spells and then others. Standing in hot sun was the common precipitating factor for vasovagal syncope followed by others. This is similar to the study of Sarasin et al 10 (52%). Syncope was found to be more common in the morning time in studies like Sarasin et al[10] (62.5%) and Zhang et al[11] (65.2%) which was same as in present study. This may be due to the diurnal variation of autonomic nervous system function.
- Cyanotic BHS were common than pallid BHS in studies like OESIL 12 (81%) and SEEDS[13] (78%) which was as same in present study. More than 2/3rd of BHS were cyanotic BHS. Majority of children (65%) were anemic in our study. It was found to be little less when compared to studies like Lerman et al[15] (54%) and Graf et al16 (52%). Family history was present in 25% patients. It was similar to the results found in other studies like Laxdal et al[14] (27%) and Lerman et al[15] (21%), suggesting the genetic influence on BHS.

CONCLUSION

- Among 120 cases majority were coming under the age group of 6 months to 12 years (p = 0.001). The mean age of presentation of syncope was 9.5yrs. Female: male ratio was 1.5:1 (p = 0.105).
- Females were more commonly affected than males. Vasovagal syncope was the most common cause which accounts for 40% of cases (n=48). Vasovagal syncope was more common in the

morning time. Breath holding spells were more common in children of age group 6mon to 3yrs (90%) & majority was cyanotic (80%).

- Family history was present in 25% of patients with BHS. Anemia of mild grade was associated with majority of cases with BHS. (76.5%) with statistical significance (p = 0.001). Blood sugar and electrolytes were normal in all patients with syncope.
- Syncope is a common clinical presentation in the pediatric age group. While benign neuro-cardiogenic syncope is the commonest cause, cardiac causes contribute to a small but important subset of these patients. A detailed history and physical examination along with an ECG is adequate to identify all cases of cardiac syncope which require further evaluation.

REFERENCES

1. Shen WK, Sheldon RS, Benditt DG, Cohen MI, Forman DE, Goldberger ZD, et al. 2017 ACC/AHA/HRS Guideline for the Evaluation and Management of Patients With Syncope: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. J Am Coll Cardiol 2017; 70(5):620- 663.
2. McHarg ML, Shinnar S, Rascoff H, Walsh CA. Syncope in childhood. Pediatr Cardiol 1997; 18(5):367-371.
3. Kanjwal K, Calkins H. Syncope in children and adolescents. Cardiac Electrophysiology Clinics 2013; 5:443-455.
4. GrubbBP.Clinicalpractice. Neurocardiogeni C syncope. N Engl J Med 2005; 352(10):1004-1010.
5. Behere SP, Weindling SN. Inherited arrhythmias: The cardiac channelopathies. Ann Pediatr Cardiol 2015; 8(3):210-220.
6. Sheldon R.How to differentiate syncope from seizure. Card Electrophysiol Clin 2013; 5(4):423-431.
7. Linzer M, Yang EH, Estes NA 3rd, Wang P, Vorperian VR, Kapoor WN. Diagnosing syncope. Part 2: unexplained syncope. Ann Intern Med 1997; 127: 76-86
8. Steiberg L A, Knilans, TK. Syncope in children: diagnostic tests have high costs and low yield. J Pediatr 2005;146: 355-8
9. Chen L, Zhang QY, Ingrid S, Chen J, Qin J, Du JB. Aetiologic and clinical characteristics of syncope in Chinese children. Acta Pediatrica 2007; 96: 1505-10
10. Sarasin FP, Louis- Simonet M, Carballo D, Slama S, Rajeshwaran A, Metzger IT, et al. Prospective evaluation of patients with syncope: a population based study. Am J Med 2001; 111: 177-84
11. Chen L, Zhang QY, Ingrid S, Chen J, Qin J, Du JB. Aetiologic and clinical characteristics of syncope in Chinese children. Acta Pediatrica 2007; 96: 1505-10
12. Ammirati F, Colivicchi F, Santini M. Diagnosing syncope in clinical practice. Implementation of a simplified diagnostic algorithm in a multicentric prospective trial the OESIL 2 study. Eur Heart J 2000; 21: 935-40
13. Shen WK, Decker WW, Smars PA, Goyal DG, Walker AE, Hodge DO, et al. Syncope evaluation in the emergency department study (SEEDS): a multidisciplinary approach to syncope management. Circulation 2004; 110: 3636-45

14. Laxdal T.Gomez MR, Reither J, cyanotic and pallid syncopal attacks in children(BHS): Dev med child neurology 1969;11:755.
15. LombroscoT, LermanP.BHS(cyanotic and pallid infantile 1967,39:563 syncope). Pediatric.
16. Graf D, Schlaepfer J, Gollut E, van Melle G, Mischler C, Fromer M, et al. Predictice models of syncope causes in an outpatient clinic. Int J Cardiol 2008; 123: 249-56.