DOI: https://doi.org/10.53350/pjmhs202317815

ORIGINAL ARTICLE

Outcome of Iron Deficiency Anemia in patients presenting with Breath Holding Spellsat Lady Reading Hospital Peshawar

MUHAMMAD ABBAS[1], BAKHT MUHAMMAD[2], AMJAD ALI[3], WASIMULLAH[4], MUJTABA GUL[5], ABID MALOOK[6]
[1]*Assistant Professor Paediatrics, Jinnah Teaching Hospital, Peshawar*
[2]*Consultant Pediatrician MERF PPP KPK*
[3,4]*Paediatrician*
[5]*District Childern Specialist Kohat)*
[6]*Medical Officer Karak*
Correspondence to Dr Bakht Muhammad, Email: Bakhtmuhammad@yahoo.com, Contact: 03465552737/03336665599

ABSTRACT

Aim: To ascertain the course of iron deficiency anemia in patients who presented to OPD and wards with breath-holding episodes.
Methodology: From June 19 through December 18, 2019, the pediatrics department of Lady Reading Hospital in Peshawar conducted this study with ethical committee approval. The study included all kids aged 1 to 5 years, both genders, and those who had Cyanotic Breath spell lasting two or more episodes. Children with Cyanotic congenital heart disease, a history of febrile convulsions or epilepsy, anticonvulsive therapy currently being used, delayed children, and malnutrition in the past were not included in the study.
Results: In our 161 patients, the average age was 2.671.811, the average weight was 12.913.33kg, and the average length of illness was 6.834.24 months. Males made up 94(58.4%) and females 67 (41.6%) of the patient population, while PICA children made up 72(44.7%). Iron deficiency anemia was present in 87(54%) of the patient population, but not in 74(46%), who had it. PICA children and children who were breastfed exclusively had a significantly higher correlation with iron deficient anemia.
Conclusion: It is highly typical for patients who experience breath holding spells to have iron deficient anemia. These patients should receive an accurate diagnosis of iron deficiency anemia and treatment to soothe the parents' concerns and limit the frequency of unneeded hospital visits.
Key words: iron deficiency anemia, breath holding spells, PICA child

INTRODUCTION

A well-known phenomenon known to predominantly affect infants between the ages of 6 and 18 months is breath-holding spells. According to some studies, these incidents can happen as late as 4 years old, during childhood. These events could be seen in about 5% of pediatrics patients. There are two categories of breath-holding spells: cyanotic breath-holding spells and pallid breath-holding spells[1].

Parents find cyanotic breath-holding spells to be incredibly terrifying. Infants are said to cry intensely for up to a minute during these episodes, holding their breath to the point where they could pass out. Rarely, the infant may go into a seizure right away after going unconscious, but most of the time they quickly come to and resume breathing regularly. For the newborn, breath-holding periods are not hazardous and pose no long-term risks[2].

On the other hand, more severe bouts could develop into incontinence and colonic jerking[3]. Despite the rarity of major breath-holding spell consequences, reports of abrupt death, protracted a systole and status epileptics have been made[3]. In locations with high anemia prevalence, World health organization recommends children aged 6 to 23 months should receive 10 to 12 milligrams of iron daily for six months. However, the effectiveness of this intervention was only moderate, according to data from earlier randomized trials of iron supplementation with iron-containing micronutrients powder[4]. These results could be the result of low compliance or poor iron absorption. According to studies, high plasma hepcidin levels prevent intestinal iron absorption and macrophage iron recycling, which results in iron-restricted erythropoiesis and anemia[5].Many research point to a link between infants' breath-holding episodes and IDA. 63(69%) of the 91 infants aged 6 to 40 months who were prospectively monitored for an average of two years had iron deficiency anemia[7]. Iron deficiency anemia was discovered in around half (47.9%) of 165 Turkish children in another group who experienced breath-holding episodes. This finding was supported by a more recent, larger Turkish study[8].

Received on 12-05-2023
Accepted on 29-07-2023

The advantages of iron therapy were proven by two investigations. A considerable decrease of cyanotic episodes was observed in one group that received iron (6 mg/kg daily) for three months compared to the control group (84% vs. 21%)[6].

It is recommended to test the results of the necessary tests, which should include complete blood count (CBC), serum iron, serum ferritin, total iron binding capacity (TIBC) and EEG. Abosdera MM, et al[9] studied children who exhibit breath-holding periods have an IDA frequency of 62.5%, aberrant EEG results in 22 patients, and a P value of insignificantly low significance for the findings in 22 patients.

This is due to the high prevalence of anemia in the study population, for IDA or empirically treats iron deficiency anemia in children with breath-holding episodes.

METHODOLOGY

From 19 June 2019 to 18 December 2019, it was conducted in the Pediatrics Department of the Lady Reading Hospital in Peshawar after receiving ethical committee approval. Children aged 1 to 5 years were included in the inclusive criteria. According to the operational criteria, cyanotic Breath-holding intervals for two or more episodes. The sole prerequisites were a history of documented febrile convulsions or epilepsy and evidence of continuous anticonvulsant therapy. In the medical record, malnutrition is not mentioned. An examination and medical history reveal cyanotic congenital heart disease. Congenital methemoglobinemia was identified through a history and physical after receiving fully informed consent. Basic demographic information, including age, gender, and length of complaint, was logged. Around 3 cc of blood was taken from each patient by a second-year resident student. Within 30 minutes after sample collection, samples were delivered to the hospital's research and diagnostic lab for the purpose of identifying iron deficiency anemia. Information on iron deficiency anemia was logged. This information was entered into a specific proforma. A statistical analysis was used to analyze the data (SPSS-version 24). For qualitative variables like gender, CHD children, PICA children, previous history of Fits, Family history of seizures, worm infestations, child entirely on cow milk feeding, and IDA, frequency and percentage

were computed. For quantitative characteristics like age, weight, and complaint duration, the mean and SD were reported. Age, gender, weight, duration of complaints, PICA kid, CHD, history of seizures and family history of fits, worm infestation (use of vermicides and expulsion of worms in the previous month), and other effect modifier characteristics were stratified against iron deficiency anemia. The post-stratification chi-square test was used, and a p-value of 0.05 was used to indicate statistical significance.

RESULTS

Among our 161 patients the average age was 2.67 1.811, the average weight was 12.91 3.33 kg, and the average length of the complaint was 6.83 4.24 months (Tables 1 and 2). (Table 3) Males made up 94(58.4%), while females made up 67(41.6% (Table 4). PICA Baby was 72 (44.7%) (Table 5). 10(6.2%) people had a history of congenital cardiac disease, whereas 151(93.8%) people did not (Table 6). While 72(44.7%) patients had no such ingestions, 89(55.3%) of the children consumed only cow milk (Table 7). Only nine (5.6%) of the children had a positive prior seizure history; the rest 152(94.4%) had negative prior seizure histories (Table 8). Six 6 children had a positive history of seizures, compared to 155(96.3%) who had none (Table 9). Infestations of worms were found in 27(16.8%) children, but not in the remaining 134(83.2%) (Table 10). Of youngsters, 87(54%) had iron deficiency anemia, compared to 74(46%) who did not (Table 11). When age was compared to the presence of IDA, it was shown that among children under the age of two, 42(56%) had it while the remainder 33(44%) did not. In patients older than 2 years, 45(52.3%) patients had IDA while 41(47.7%) did not. This difference wasn't statistically significant (p value: 0.641) (Table 12). Gender stratification in relation to IDA revealed that out of 94 males, 52(55.3%) displayed the condition, and out of 67 females, 35(40.2%) did not, whereas 42(44.7%) males and 32 (47.8%) females did. This did not have a significant p value (p=0.699) (Table 13). Children's weight was compared to IDA, and the results showed that 51(58.6%) of those under 12 kg had IDA while the other 36 (41.4%) did not.36 patients (48.6%) who weighed more than 12 kg exhibited IDA, compared to 38 (51.4%) who did not. This change wasn't statistically significant (p value: 0.206) (Table 14). According to a stratification of the complaint's duration, 64 (47.4%) of the children with a duration of less than 10 months did not exhibit IDA, while 71(52.6%) did. Of those who had been compliant for longer than 10 months, 16(61.5%) patients had IDA, compared to 10(38.5%) who did not. Due to the low significance of this discrepancy (p value of 0.400), (Table 15). Out of 72 PICA children, 54(75%) and out of 89 Non-PICA children, 33 37.1%) showed IDA, whereas it was absent in the remaining 18 (25%) PICA and 56 (62.9%) Non-PICA children, according to the stratification of PICA children against IDA. With a P value for this difference of =0.000, there was a significant difference (Table 16). Congenital heart disease was stratified against IDA, with IDA not present in the remaining 3(30%) CHD and 71(47%) Non-CHD children out of 10 CHD children and 7 (70.0%) out of 151 non-CHD children. Because the p value for this was =0.287, the difference was not statistically significant (Table 17).Of 89 such children who had been exclusively breastfed, 71(79.8%) had IDA whereas the others did not, according to a stratification of the practice against the disease. 16(22.2%) patients who do not exclusively breastfeed exhibited IDA, compared to 56(77.8%) who did not. With a p value of 0.000, this difference was significant (Table 18). Of 9 such children, 6(66.7%) showed IDA while the other 3(33.33%) did not, according to a stratification of Prior History of Seizure against IDA. For patients without a prior seizure history, IDA was present in 81(53.3%) patients while it was absent in 71(46.7%).This change wasn't statistically significant (p value: 0.428). (Table 19). Out of 6 such children, 5(83.3%) showed IDA while the remaining 1(16.7%) did not display IDA, according to a family history of seizure stratification against IDA study. For patients without a family history of seizures, IDA was present in 82(52.9%) patients while it was absent in 73(47.1%). This change wasn't statistically significant (p value: 0.123) (Table 20). Of 27 such youngsters, 12(44.4%) had IDA while the remaining 15(55.6%) did not, according to a stratification of worm infestation versus IDA. In patients without worm infestation, 59(44%) did not exhibit IDA, while 75(56%) did. This difference was no significant (p value 0.274) (Table 21).

Table 1: Mean age

n	Mean	St. Div
161	2.677	1.1811

Table 2: Mean weights

n	Mean	St. Div
161	12.9130	3.33240

Table 3: Mean duration of complaint

n	Mean	St. Div
161	6.83	4.242

Table 4: Gender frequency and percentages

Gender	Frequency	Percentage
Male	94	58.4
Female	67	41.6
Total	161	100

Table 5: Pica presentations

PICA	Frequency	Percentage
Yes	72	4.47
No	89	5.53
Total	100	100

Table 6: Congenital heart diseases

Congenital Disease	Frequency	Percentage
Yes	10	6.2
No	151	9.38
Total	100	100

Table 7: Cow milk intakes

Milk intake	Frequency	Percentage
Taking	89	55.3
Not taking	72	44.7
Total	100	100

Table 8 & 9: Seizures history& family history of seizures

Seizures /Family history	Frequency	Percentage
Present	9/6	5.6/3.7
Absent	152/155	94.4/96.3
Total	100	100

Table 10/11: Worms infestation & iron deficiency anemia

Worms Infestation / Iron Deficiency Anemia	Frequency	Percentage
Valid	27/87	16.8/54
Not valie	134/74	83.2/46
Total	161	100

Table 12: Age group versus iron deficiency anemia

Age groups	Iron Deficiency Anemia		
	Yes	No	Total
Equal or less count than 2 %age with in groups	42(56%)	33(44%)	75(100%)
Greater count than 2 %ages with in groups	45(52.3%)	41(47.7%)	86(100%)

P value 0.641

Table 13: Gender vs iron deficiency anemias

Gender	Iron Deficiency Anemia		
	Yes	No	Total
Male count %ages within groups	52(55.3%)	42(44.7%)	94(100%)
Total count ages within gender	87(54%)	74(46%)	161(100%)
Total count ages within gender	87(54%)	74(46%)	161(100%)

P value 0.669

Table 14: Weights versus iron deficiency anemia

Weight	Iron Deficiency Anemia		
	Yes	No	Total
<12 counts %ages within weights	51(58.6%)	36(41.4%)	87(100%)
>12 counts %ages with in weights	36(48.6%)	38(51.4%)	74(100%)
Total counts %ages within weights	87(54%)	74(46%)	161(100%)

P value 0.206%

Table 15: Complaints duration agaisnt iron deficiency anemia

Weight	Iron Deficiency Anemia		
	Yes	No	Total
<10 months count% ages with in duration	71(52.6%)	64(47.4%)	135(100%)
>10 months counts %ages with in duration	16(61.5%)	10(38.5%)	26(100%)
Total Count %Ages Within Duration	87(54%)	74(46%)	161(100%)

P value 0.400

Table 16 pica versus iron deficiency anemia

PICCA	Iron Deficiency Anemia		
	Yes	No	Total
Yes count with in pica child	54(75%)	18(2%)	72(100%)
No count with in pica child	33(37.1%)	56(62.9%)	89(100%)
Total count with in pica child	87(54%)	74(46%)	161(100%)

P value 0.00

Table 17: Congenital versus iron deficiency anemia

Congenital heart disease	Iron Deficiency Anemia		
	Yes	No	Total
Yes count %ages with in heart disease	7(70%)	3(30%)	10(100%)
No count %ages with in heart disease	80(53%)	71(47%)	151(100%)
Total count %ages with in heart disease	87(54%)	74(46%)	161(100%)

P value 0.287

Table 18: Cow milk intake versus iron deficiency anemia

Cow milk feeding	Iron Deficiency Anemia		
	Yes	No	Total
Yes count %ages within feeding	71(79.8%)	18(20.2%)	89(100%)
No count %ages within feeding	16(32.3%)	56(77.8%)	72(100%)
Total count %ages within feeding	87(54%)	74(46%)	161(100%)

P value 0.00

Table 19: Previous history of seizures versus iron deficiency anemia

Previous history of seizures	Iron Deficiency Anemia		
	Yes	No	Total
Yes count %age with in previous history	6(66.7%)	3(33.3%)	9(100%)
No count %age with in previous history	81(53.3%)	71(46.7%)	152(100%)
Total count %age with in previous history	87(54%)	74(46%)	161(100%)

P value 0.428

Table 20: Family history of seizure versus iron deficiency anemia

Family history of seizure	Iron Deficiency Anemia		
	Yes	No	Total
Yes count %age of family history	5(83.3%)	1(16.7%)	6(100%)
No count %age of family history with in	82(52.9%)	73(47.1%)	155(100%)
Total count %age of family history with in	87(54%)	74(46%)	100%

P value 0.123

Table 21: Worms infestation versus iron deficincy anemia

Worms infestation	Iron Deficiency Anemia		
	Yes	No	Total
Yes count %age with in infestation	12(44.4%)	15(55.6%)	100%
No count %age with in infestation	75(56%)	59(44%)	134(100%)
Total count %age with in infestation	87(54%)	74(46%)	161(100%)

P value 0.123

DISCUSSION

Most commonly seen in infants between the ages of six and 18 months, breath-holding periods can also occasionally be seen in older children. These spells affect around 50 children out of every 1000, which worries parents. Children or infants who cry too much may hold their breath for so long that they pass out. According to studies, iron deficiency causes hypoxia, anemia and reduced lung oxygen exchange[10-11]. The purpose of this study was to determine the prevalence of iron deficiency anemia in children who presented to our local hospital with episodes of breath holding. These children were then treated with readily available and affordable iron supplements to lessen the anxiety experienced by the parents, reduce the number of needless investigations, and reduce the number of hospital visits. 37(38.95%) of the 95 cases in this study were between the ages of 37 and 60 months, whereas 58(61.05%) of the cases were between 636 months and 636.Age was determined as 38.74+11.98 months, with 58.95% of the population (n=56) being male and 39(41.05%) being female. The average age of the 161 patients in our study was 2.67 1.811. The average length of the complaint was 6.83 4.24 months. 94 men (58.4%) and 67 women (41.6%) made up the population. PICA Child had a 44.7% age of 72. 87 (54%) of the children in our study had iron deficiency anemia, compared to 74(46%) who did not. Breath-holding episodes are often linked to iron deficiency anemia, according to studies from throughout the world, which have found similar prevalence to our study's findings[11-12]. According to a study by Shamaoon et al[13] in Punjab, 51.58% (n=49) of individuals with breathlessness had iron deficiency anemia, while 48.42% (n=46) did not.Another comparable study, carried out in Rawalpindi, revealed a 56.67% correlations between breath-holding episodes and iron deficiency anemia. The results of our study corroborate those from research done in Punjab and Rawalpindi. It has also been demonstrated that treatment with iron supplements significantly decreased its frequency[13].

When Handan Gençgönül and colleagues[14] examined the serum iron and zinc levels of patients experiencing breath-holding episodes, they discovered that 56% of the patients had anemia. Another recent study examined the clinical and biochemical data of[15] children who experienced breath holding periods, taking into account the different forms of BHS and their relationship to iron deficiency.62.5% of children with BHS have anemia, which was discovered after careful assessment of neurodevelopmental status and EEG results. After 12 weeks of elemental iron therapy, BHS has greatly decreased in frequency. Rahul Jan and colleagues[16] investigated the effects of iron supplementation in children with breath-holding periods regardless of their iron status and investigated the parameters associated with the response. They came to the conclusion that iron supplementation is effective in the management of breath-holding spells. Children with breath holding episodes that are not anemic and have adequate iron levels can benefit from iron supplements.

Children in BHS are significantly more likely to develop anemia when some of the characteristics that enhance the incidence of iron deficiency anemia, such as PICA children and exclusive breastfeeding, are present[17]. Only the worm infestation failed to demonstrate any meaningful link. Out of 89 children who were exclusively breastfed, 71(79.8%) had IDA, while the other 14 did not, according to a stratification of breast feeders against IDA. 16(22.2%) patients who do not exclusively breastfeed exhibited

IDA, compared to 56(77.8%) who did not (p value 0.001). When compared to the remaining 18(25%) PICA and 56(62.9%) non-PICA children, IDA was not present in 54(75%) of the 72 PICA children and 33(37.1%) of the 89 non-PICA children (p value 0.001). They further support the link between anemia and breath-holding periods.

CONCLUSION

It has been determined that patients who experience breath holding episodes frequently have iron deficient anemia. Moreover, factors like solely breast-feeding and PICA children are linked to an increased prevalence of iron deficiency anemia in such children. Thus, these individuals should have comprehensive evaluation for causes of iron deficiency anemia and treatment. The frequency of pointless investigations and hospital visits will also decline as a result of the parents' anxiety being reduced. It is also advised to conduct more research to corroborate these risk factors.

Authorship and contribution declaration: Each author of this article fulfilled following Criteria of Authorship:

1. Conception and design of or acquisition of data or analysis and interpretation of data.
2. Drafting the manuscript or revising it critically for important intellectual content.
3. Final approval of the version for publication.

All authors agree to be responsible for all aspects of their research work.

Conflict of interest: None
Funding: None

REFRENCES

1. Goldman RDJCFP. Breath-holding spells in infants. 2015;61(2):149-50
2. Aminiahidashti HJE. Infantile apparent life-threatening events, an educational review. 2015;3(1):8
3. Rathore G, Larsen P, Fernandez C, Parakh MJCrinm. Diverse presentation of breath holding spells: Two case reports with literature review. 2013;2013
4. Tam E, Keats EC, Rind F, Das JK, Bhutta ZA, Micronutrient supplementation and fortification interventions on health and development outcomes among children under-five in low- and middle-income countries: a systematic review and meta-analysis. *Nutrients.* 2020; **12**: 289
5. Pagani A, Nai A, Silvestri L, Camaschell C, Hepcidin and anemia: a tight relationship. *Front Physiol.* 2019; **10**1294
6. Mocan H, Yildiran A, Orhan F, Erduran EJAodic. Breath holding spells in 91 children and response to treatment with iron. 1999;81(3):261-2
7. Yilmaz U, Doksoz O, Celik T, Akinci G, Mese T, Yilmaz TSJPjoms. The value of neurologic and cardiologic assessment in breath holding spells. 2014;30(1):59
8. Işikay S, Hızlı ŞJJop, health c. Frequency of coeliac disease in children with breath-holding spells. 2014;50(11):916-9
9. Abosdera MM, Sabry MM, Abdel-Moneim ESJAJRC. Breath holding spells; its relation to iron deficiency anemia, and electroencephalogram findings. 2016;12(4):35-45
10. Goldman RD. Breath-holding spells in infants. Can Fam Physician. 2015;61(2):149-50
11. Azab SFA, Siam AG, Saleh SH, Elshafei MM, Elsaeed WF, Arafa MA, et al. Novel findings in breath-holding spells: A cross-sectional study. Medicine. 2015;94(28).
12. Yilmaz U, Doksoz O, Celik T, Akinci G, Mese T, Yilmaz TS. The value of neurologic and cardiologic assessment in breath holding spells. Pakistan journal of medical sciences. 2014;30(1):59
13. Shamaoon M, Shaukat S, Bajwa FE, Ahsan M. Iron deficiency anemia in pediatric patients with breath holding spells. Annals of Punjab Medical College. 2018;12(4).
14. S I. An evaluation of 180 children with breath holding spells. Turkiye Klinikeleri Pediatr. 2014;23:53-8
15. Gençgönül H, Cin Ş, Akar N, Deda G. Iron and zinc levels in breath-holding spells. J Ankara Med School. 2002;21:99-104
16. Abosdera MM, Sabry MM, Abdel-Moneim ES. Breath holding spells; its relation to iron deficiency anemia, and electroencephalogram findings. American J Res Communication. 2016;12(4):35-45
17. Jain R OD, Singh A, Jajoo M. Effect of iron supplementation in children with breath holding spells. 2017;53(3):749-5.

This article may be cited as: Abbas M, Muhammad B, Ali A, Wasimullah, Gul M, Malook A: Outcome of Iron Deficiency Anemia in patients presenting with Breath Holding Spellsat Lady Reading Hospital Peshawar. Pak J Med Health Sci, 2023;17 (8):15-18.