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Weaning Practice in Children with Iron Deficiency Anemia

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ABSTRACT

Background: Weaning, also called as supplemental feeding, is the process of progressively reducing nursing or bottle-feeding while introducing solid meals to newborns. **Methodology:** A cross-sectional comparative design was used to carry out this cross-sectional investigation. To assess the weaning practices, feeding habits, and hematological profiles of two groups of children, one with iron deficiency anemia and the other without IDA. This study contrasts them at different points in time. IBM SPSS was used to analyze the data. 129 kids without iron deficiency anemia and 65 kids with it took part in the study. The association between early and late weaning and iron deficiency anemia (IDA) and non-IDA was evaluated using the chi-square test. The association between continuous variables, such as ferritin levels and the period between weaning and proper food intake, as well as the association between the weaning interval and children's hemoglobin levels, was investigated using correlation statistical tests. **Results:** Iron deficiency anemia (IDA) was reported by 33.3 percent of individuals, with pallor being the most prevalent symptom (33.8%). 44.6 percent weaned early, while 29.2% weaned late. IDA was a significant association with late weaning (p=0.00). There was a strong negative correlation between delayed adequate nutrition introduction and ferritin (r=-0.33, P=0.00, showing that the risk of having iron deficiency anemia (IDA). **Conclusion:** The findings demonstrate a strong association between delayed weaning and iron deficiency anemia (IDA) in children; late weaning is linked to emphasizes the significance of prompt and appropriate weaning to avoid IDA.

INTRODUCTION

Weaning, also known as supplemental feeding, is the process of progressively reducing nursing or bottle-feeding while introducing solid meals to newborns. In addition to having an impact on long-term health, breastfeeding is a critical nutritional milestone in an infant's growth and development. (1) The abnormal phase of an infant's development, weaning from breastfeeding, involves changes to immunological, psychological, physiological, and nutritional aspects. it can mean stop breastfeeding completely or just introducing additional food to the baby's diet gradually. (2)Iron Deficiency Anemia is a reduction in total hemoglobin levels caused by insufficient iron. It is a highly frequent dietary deficiency in pediatric health issues, particularly in developing nations. (3).

The primary cause of iron deficiency in babies is the prompt consumption of milk from cows during weaning and the absence of iron-rich additional nourishment after 6 months of age. The American Academy of Pediatrics (AAP) recommends starting these foods at six months since they are essential for nutrient beginning weaning sooner than the suggested four to six months of age and provide low-iron diets. (4)

Iron deficiency impairs newborns ' mental and physical development. It is essential for neurological processes such as the generation of neurotransmitters and brain development. The two years are crucial for brain growth, and deficiencies in iron during this period can have long-term cognitive and behavioral consequences. (5)

Nurses are critical in avoiding and curing iron deficiency anemia in newborns during weaning. They inform moms about the problems, provide iron-rich diets, and advise them on ferrous sulfate dosage and administration.(6).

Iron deficiency anemia is thought to account for fifty percent of all anemias. It is particularly common among the underdeveloped countries.(7).

Iron in the milk from mothers, unfortunately, is not well

absorbed. For the first six months, the baby must rely heavily on its iron stores, which are then supplemented by food. Iron insufficiency develops as a result of poor weaning procedures and insufficient nutrition during childhood (8). The World Health Organization's recommendations state that anaemia is considered a public health issue when it affects 5 percent of the population. Its public health relevance is mild in any group between 5 and 19 percent, moderate between 20 and 29 percent, and severe in any group between 40 percent. (9).

The purpose of this study is to evaluate the weaning process and weaning knowledge among caregivers of infants with and without iron deficiency anemia (IDA). It also looks for possible contributing factors by comparing and analyzing the differences between the two groups.

METHODOLOGY

This study was conducted using a cross-sectional comparative design. The study was conducted at Sheikh Khalifa Bin Zayed Al Nahyan/Combined Military Hospital, Muzaffarabad, Azad Jammu and Kashmir, Pakistan. This study compares two groups of children, one with iron deficiency anemia and one without, at moments in time to evaluate their weaning practices, feeding patterns, and hematological profiles. Data was collected following the approval of the synopsis. The study duration was from December 18, 2022, to April 18, 2023. The sample size was calculated by reviewing the literature and using an empirical technique. 65 children with Iron Deficiency anemia and 129 without IDA participated in a study. (10) . Children aged 6 to 24 months with medically diagnosed iron deficiency anemia (IDA) based on hemoglobin, ferritin levels, or response to iron therapy were included.

For the continuous variables mean and standard were found. The chi-square test was utilized to assess the association between early weaning and late weaning with iron deficiency anemia (IDA) and non-IDA. Correlation statistical tests were conducted to examine the association between continuous variables, including Ferritin Levels and the time interval from Weaning to proper food intake, as well as the relationship between the Weaning Interval and Hemoglobin Levels in Children. A p-value <0.05 was considered a significant value.

RESULTS

Table 1 shows descriptive statistics for major hematologic parameters and weaning intervals in a sample of 195 children. The hemoglobin levels ranged between 8.37 and 15.89 g/dl, with a mean of 12.31g/dl and a standard deviation of 2.06. Ferritin values ranged from -2.26 to 77.84 ng/mL, suggesting possible data entry errors or outliers, with an average of 36.45 ng/mL. MCV readings varied from 58.38 to 98.22 fL, with an average of 79.74 fL. The time between the beginning of weaning and the introduction of good solid food consumption ranged from 0.41 to 11.16 months, with a mean of 3.99 months and a standard deviation of 2.01.

Table 1

Descriptive Statistics

Variables	Frequency	Min ± Max	Mean Value	SD
Hemoglobin (g/dL)	195	8.3749±15.889	12.3148	2.0557
Ferritin (ng/mL)	195	-2.2613±77.8378	36.4527	20.2454
MCV (fL)	195	58.3764±98.2179	79.739	8.6745
Interval Weaning to Proper Food (months)	195	0.409±11.1594	3.9853	2.0078

Table 2 shows a frequency study of weaning methods and iron deficiency anaemia (IDS) in children.33.3 percent of the 195 participants had IDA, while 66.7% did not. Pallor was the most common chief complaint, reported by 33.8% of participants, followed by poor appetite (25.1%) and recurrent infections (16.4%). In terms of feeding methods, 36.4 percent of the children were exclusively breastfed, 28.2% were fed formula, and 35.4 percent were fed a combination of both. Early weaning, defined as weaning before 6 months of age, was reported in 44.6% of the children, whereas late weaning, defined as weaning after 9 months, was recorded in 29.2%. These findings point to possible links between weaning techniques and the occurrence of IDA.

Table 2

Frequency Analysis of Weaning Practices and Iron Deficiency Anemia

Category	Value	Frequency	Percent
Groups	Non-IDA	130	66.7%
	IDA	65	33.3%
	Total	195	100.0%
Chief Complaints	Developmental Delay	19	9.7%
	Frequent Infections	32	16.4%
	Irritability	29	14.9%
	Pallor	66	33.8%
	Poor Appetite	49	25.1%
	Total	195	100.0%
Patterns of Feeding	Exclusive Breastfeeding	71	36.4%
	Formula Feeding	55	28.2%
	Mixed Feeding	69	35.4%
	Total	195	100.0%
Early Weaning (<6 months)	No	108	55.4%
	Yes	87	44.6%
	Total	195	100.0%
Late Weaning (>9 months)	No	138	70.8%
	Yes	57	29.2%
	Total	195	100.0%

Table 3 shows the associations between early weaning and iron deficiency anemia (IDA). A strong correlation is seen, with children diagnosed with IDA being more likely to have had early weaning. This emphasizes the

significance of weaning at the optimal time to avoid anemia. The timely introduction of supplementary foods may play an important role in lowering the risk of iron deficiency.

Table 3

Association between Early Weaning (<6 months) and Iron Deficiency Anemia (IDA)

Group	Early Weaning No	Early Weaning Yes	Total	p-value
Non-IDA (Control)	88 (81.5%)	42 (48.3%)	130 (66.7%)	0.00
IDA	20 (18.5%)	45 (51.7%)	65 (33.3%)	
Total	108 (100%)	87 (100%)	195 (100%)	

Table 4 reveals a statistically significant connection (p=value0.00) between late weaning (beyond nine months) and iron deficiency anaemia (IDA). When compared to the non-IDA group, more children with IDA had late weaning. Specifically, more than half of the IDA group experienced late weaning, whereas most of the non-IDA group did not. This shows that late weaning is highly associated with an increased risk of acquiring IDA.

Table 4

Association between Late Weaning (>9 months) and Iron Deficiency Anemia (IDA)

Group	Late Weaning No	Late Weaning Yes	Total	p-value
Non-IDA (Control)	108 (78.3%)	22 (38.6%)	130 (66.7%)	0.00
IDA	30 (21.7%)	35 (61.4%)	65 (33.3%)	
Total	138 (100%)	57 (100%)	195 (100%)	

Table 5 depicts the association between ferritin levels and the time interval between weaning and the introduction of appropriate food intake. A substantial negative correlation (r = -0.633, p = 0.000) implies that ferreting levels fall as the gap grows. The p-value of 0.000 indicates that the link is statistically significant (p < 0.01). This suggests that a delay in introducing an appropriate diet is associated with lower ferritin levels in children. (Table 5).

Table 5

Correlation between Ferritin Levels and Interval from Weaning to Proper Food Intake

Variable	Correlation Coefficient (r)	p-value
Ferritin (ng/mL)	1.00	—
Interval Weaning to Proper Food (months)	-0.633	0.00
Interval Weaning to Proper Food (months)	-0.633	0.00
Ferritin (ng/mL)	1.00	—

Table 6 shows the association between the time interval from weaning to proper food intake and hemoglobin levels. A strong negative connection (r=0.649, p-value=0.00) shows that delayed introduction of an appropriate diet is significantly associated with lower hemoglobin levels. This research emphasizes the importance of prompt weaning in preventing iron-deficient anemia in children.

Table 6

Correlation between Weaning Interval and Hemoglobin Levels in Children

Variables	Interval from Weaning to Proper Food (months)	Hemoglobin (g/dL)
Interval from Weaning to Proper Food (months)	1	-0.649
Hemoglobin (g/dL)	-0.649	1
Significance (2-tailed)	0.000	0.00
N	195	195

DISCUSSION

Although breastfeeding exclusively has decreased for six months, the benefits of nursing for infant health have long been recognized. maternal employment and the length of time spent exclusively breastfeeding were found to be significantly correlated in one study. another finding revealed that children's nutritional status was correlated with their protein intake.

In our study, we evaluated the method of weaning and weaning knowledge of mothers of infants with and without iron deficiency anaemia (IDA) in our research.

The World Health Organization suggested increasing the global exclusive breastfeeding rate to six months, reaching 70 percent by the years 2030. (12) Due to an effective breastfeeding program in the nation, a study conducted in Sri Lanka revealed high rates of breastfeeding exclusively at six months, 65.9 percent. A council of specialists and officials has been continuously evaluating violations of the Breastfeeding Code since it was put into effect, strengthening it. (13).

Our findings show that hematological and weaning–related parameters vary significantly among the children we investigated. Hemoglobin levels vary widely, indicating variances in anaemia severity, but ferritin levels are inconsistent, potentially due to data entry errors or biological variation. The mean corpuscular volume (MCV) results fall within the predicted ranges for anemia assessment. Furthermore, the weaning to solid food interval varies significantly, showing that different feeding strategies may alter the nutritional results and levels of iron in children. Hamid et al. found reference intervals for hemoglobin and mean corpuscular volume in an ethnically varied group of Canadian infants aged 2 to 36 months of age. another study that anaemia caused by iron deficiency in children during weaning is associated with women awareness and behaviors.(15) improper breastfeeding methods, such as prolonged introduction of meat and decreased iron from foods intake, are related with an increased risk of iron deficiency and anaemia in children our findings revealed a link between weaning techniques and iron deficiency anaemia (IDA). The most common complaints were pallor, a weak appetite, and infections. feeding practices differed, with early and late weaning likely impacting

iron deficiency anemia prevalence.

Our results demonstrated a considerable correlation between iron deficiency anemia and late weaning, highlighting the importance of introducing solid foods on time. Anemia can be avoided, and healthy child development can be promoted with the right dietary advice and early treatment. The delayed introduction of appropriate food following weaning is linked to reduced ferritin levels in children, according to a substantial negative correlation. This noteworthy correlation highlights how crucial timely dietary intake is in preventing iron deficiency. Jessica et al.'s study demonstrated the connection between iron consumption, ferritin, and hemoglobin levels in children between the ages of 24 and 36 months; however, it did not address the connection between ferritin levels and weaning (17)ferritin levels and other iron status indicators in the infants first years of life were not impacted by the period of solid meal introduction in preterm infants according to another study. (18)

Children's hemoglobin levels are closely correlated with the delayed introduction of an appropriate diet. This emphasises how crucial prompt weaning is in preventing iron-deficient anaemia. Nutritional education can lower the incidence of anaemia and enhance the health of children by promoting suitable weaning practices. Neonatal death rates and early infantile anaemia can be decreased by delaying cord severance. Infants' micronutrient status can be maintained by introducing supplemental diets that contain minerals such as zinc and iron and fatty acids.(20)

CONCLUSION

The results show that the prevalence of iron deficiency anemia (IDA) in children is strongly correlated with weaning techniques. Children with IDA are more likely to undergo delayed weaning, and there is a significant correlation between late weaning and an increased risk of getting IDA. The need for correct nutritional practices is further highlighted by the fact that lower ferritin and hemoglobin levels are linked to delays in introducing appropriate meals after weaning. These findings highlight how crucial early and suitable weaning is to maintaining children's healthy levels of iron and preventing anemia.

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