A Study to Assess the Effectiveness of Iron Fortified Riceflakes on Hemoglobin Level among Preschoolers with Nutritional Anaemia at Selected Schools, Coimbatore

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Abstract: *Iron deficiency anaemia (IDA) is one among the "top ten" riskfactors contributing to the global burden of disease. The research design adopted for the study was one group pre test post test control group experimental design. The population of the study was preschoolers (3-4 years).The sample number was 50 preschoolers with haemoglobin level between 8-10 gm/dl. Non probability purposive sampling technique was used to select the samples. The tool consists of demographic data and clinical evaluation tool for assessing anaemia. The demographic data include the child's age, sex, birth order, monthly family income, type of family, present weight, parental occupation, deworming done within four months and food habits. The clinical evaluation include the general appearance, hair, conjunctiva, lips, nail buds, oral mucosa and palms along with the Haemoglobin level using hemoglobinometer. Among the preschoolers 59.99% were anaemic. The experimental group is provided with jaggery based ready- to- use snack for one month and Hb assessed. The observed t-value of pre test and post test mean of haemoglobin level was 8.50 and 9.66 respectively and t value was 6.366 which is significant at 0.001 levels. The mean Hb level among control group was 8.47and 8.48 respectively with a t value 0.228 which is not significant at any level. The mean value for the control and experimental group after intervention is 8.48 and10.84 respectively with a t value 14.712 which is highly significant, at P<0.001.The computed t value shows no significant association between Hb level and food habits.*

Keywords: Effectiveness, iron fortified riceflakes, Iron deficiency anaemia, Preschooler

1. Introduction

Iron is an essential dietary mineral that is involved in various bodily functions, providing energy & brain development. All the age group babies, toddlers, preschoolers and teenagers are at higher risk of iron deficiency due to insufficient intake of dietary iron or poor availability or both. Bioavailability of iron from the dietary source depends on the iron content of the diet, actual composition of the diet and the absorption rate.

Preschool age and adolescence are more prone to IDA, due to discrepancy between the demand and supply of iron for rapid somatic growth. Iron requirement is affected during growth period by expansion of blood volume and need of the mineral for muscular development. The main signs and symptoms of iron deficiency anaemia in children are Behavioural problems, Repeat infections, Loss of appetite, Lethargy, Breathlessness Increased sweating, Strange 'food' cravings (pica) like eating dirt, Failure to thrive at the expected rate.

2. Objectives of Study

- Assess the prevalence of Nutritional Anemia among preschoolers in two Schools.
- Evaluate the effectiveness of iron fortified riceflakes on Hb level.
- Associate the Hemoglobin level with food pattern of children in experimental group.

3. Materials and Methods

Research approach design
Research design adopted for the study was one group pre test post test control group experimental design

Setting of the Study
The study was conducted at two different schools at Coimbatore.

Population
The population of the study was 90 preschoolers (3-4 years) in both the Schools.

Sample and Sample technique
The sample size was a heterogeneous group of 50 children after screening. Children whose Hb level between 8-10gm/dl was enrolled 25 each in both control and experimental group. Non probability purposive sampling was used to select the samples who met inclusion criteria.

Description of the tool

Section 1: Demographic data of the child
The demographic data include the child's age, gender, birth order, food habits, parental occupation, monthly income, type of family.

Section 2: Clinical Evaluation
The clinical evaluation include the general appearance, hair, conjunctiva, lips, nail buds, oral mucosa, palms and Hb level was monitored using Sahli's method to identify the clinical evidence of anaemia.

Components of Iron Fortified Rice Flakes

Preparation:
The iron fortified riceflakes is prepared by washing the red rice flakes in warm water to clear the dust. The jaggery is melted and the impurities are removed using a filter. Then rice flake is mixed with jaggery syrup till it become palatable.

Content:
The iron fortified riceflakes in one serving consist of 30 grams rice flakes and 25 grams of jaggery

Intervention
The children in the experimental group were given iron fortified riceflakes 30gm rice flakes and 25gm jaggery at mid-morning snack time, 10am everyday for one month under the supervision of the researcher..

4. Data Analysis

Data was planned to be analyzed on the basis of objectives
1) Assessment of prevalence of anaemia among preschooler using frequency & percentage table.
2) Effectiveness of iron fortified riceflakes on Hb level among preschoolers was analysed using paired 't' test.
3) Associate the Haemoglobin level with selected demographic data among both
   Control and Experimental group was analysed using Chi-square

5. Result

Table 1: Prevalence of Anemia among preschool children

S. No.	Hb level	Frequency	Percentage
1	Less than 8gm/dl	4	4.44
2	8-10gm/dl	50	55.55
3	Greater than 10gm/dl	36	40

Table 2: Pre-test Post-test Hb level among preschooler children in Experimental group

Variable	Mean		SD	't' value
Hb	Pre test	8.52	0.783	14.996***
	Post test	10.84	0.687	

***$P< 0.001$

The above table shows the obtained t-value for the Hb level after the intervention was 14.996 it is significant at 0.01 levels. It shows there is a significant increase in Hb level of the children.

Table 3: Pre-test Post-test Hb level among preschooler children in Control group

Variable	Mean		SD	't' value
Hb	Pre test	8.47	0.500	0.228 (NS)
	Post test	8.48	0.413	

NS = Not significant

The above table shows the obtained t-value for the Hb level after the intervention was 0.228 it is not significant at 0.001 level. It shows there was no significant increase in Hb level of the children.

Table 4: Comparison of Hb level between Experimental and Control group after Intervention

Variable	Post test	Mean	SD	't' value
Hb	Experimental group	10.84	0.687	14.712***
	Control group	8.48	0.413	

The above table shows the obtained t-value for the Hb level after the intervention was 14.712 itis significant at 0.001 level. It shows there was a significant increase in Hb level of the children after the intervention.

6. Discussion

1) **The first objective of the study was to assess the prevalence of Nutritional Anemia among preschoolers at selected schools**
   Among 90 children screened 50 of them had Hb level between 8-10gm/dl that is about 55.55%, 4 of them have Hb level less than 8gm/dl and 36 children have Hb level greater than10gm/dl. It shows that 59.99% children are anaemic. The mean value of Hb during screening was 8.52 in the experimental group and 8.47 in control group. It shows most of children comes in between haemoglobin level 8-10gm/dl and are anaemic.

2) **The second objective was to evaluate the effectiveness of iron fortified riceflakes on haemoglobin level among preschoolers**
   The pre-test value shows that the mean Hb level of children were 8.52 and post test mean 10.84, which shows a mean increase of 2.32gm/dl within 1 month. The paired 't' value for pre and post test Hb level increase was 14.996 and was more than the table value. It is evident that there is an increase in Hb level after fortified iron intervention which was significant at 0.001 levels. The mean Hb level among control group was 8.47and 8.48 respectively with a't' value 0.228 which is not significant at any level. The mean value for the control and experimental group after intervention is 8.48 and 10.84 respectively with 't' valuen14.712 which is highly significant, at P<0.001.

3) **The third objective was to associate the hemoglobin level with food pattern of children in two schools**
   The data shows 32% of children in control group are vegetarians whereas 68% belong to the category of non-vegetarians, in experimental group 28% vegetarians & 72% of them are non vegetarians. The association of Hb level and food habits after the intervention was computed using independent t test.The non vegetarians have more hemoglobin level when compared to the vegetarians. The mean value for non vegetarians are 10.97 where as for vegetarians is 10.50, t value 1.591 which is not significant at any level.

7. Conclusion

Iron fortified riceflakes for one month made significant increase in haemoglobin level among preschooler. It is recommended to give the same for three months to replenish the iron store. The parents of children in control group were provided with a self instructional module in the form of pamphlets which contains the recipe of jaggery based ready-

to- eat snack along with the importance of iron during childhood.

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