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Effectiveness of a School Nutrition Program for Preventing Iron Deficiency Anemia in School Children

A Thesis Submitted for Fulfillment of Ph.D. Childhood Studies
(Child Health & Nutrition)

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CONTENTS

List of Abbreviations

CDC	:	Center of Disease Control and Prevention
DHS	:	Demographic and Health survey
FGD	:	Focus group discussion
GDP	:	Gross Domestic Product
HIO	:	Health Insurance Organization
IDA	:	Iron deficiency anemia
IQ	:	Intelligence Quotient
MCH	:	Mean cell hemoglobin
MCHC	:	Mean cell hemoglobin concentration
MCV	:	Mean cell volume
MI	:	Micronutrient Initiative
MOE	:	Ministry Of Education
MOHP	:	Ministry Of Health and Population
NNI	:	National Nutrition Institute
RDA	:	Recommended daily allowance
RDW	:	Red cell distribution width
SI	:	Serum Iron
TIBC	:	Total iron binding capacity
UNICEF	:	United Nation of Children Fund
WHO	:	World Health Organization

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ABSTRACT

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Abstract:

Background: Iron deficiency Anemia (IDA) is one of the most common widespread nutritional disorders, affecting large number of children and women in developing countries.
Objective: To determine the effectiveness of school nutrition program that offers the School Pie/Biscuit in preventing IDA.
Methodology: The present study included 60 first grade schoolchildren, from 3 primary public schools in Nasr City-Cairo during academic year 2014-2015. Males represented 43.3%, while female school children were 56.7%.
Results: The prevalence of IDA in studied school children is 40%. The mean weight of children after the school nutrition program was significantly higher than before (23.87 ±5.02, 24.96 ±5.30 Kgm, t= 4.42, P<0.000). There was no significant differences between the mean values of Hematological parameters before & after the school nutrition program (P > 0.05). The mean values of ferritin and Iron were significantly higher after the school nutrition program. In anemic children (24), HT & S Iron were significantly higher after the school nutrition program (t= -2.158. P=.042, t=-4.141, P=.000, respectively). Gender Statistics among anemic children showed no significant differences (P>0.05).
Conclusion: It can be concluded that in the study sample the school nutrition program caused significant increase in serum ferritin and serum iron reflecting effectiveness in helping with iron deficiency.

Keywords: Anemia, school children, school nutrition program, school pie.

Introduction

Introduction:

Iron deficiency affects the health of two billion people worldwide, with a range of adverse health and social consequences, including anemia, reduced work capacity, impaired immune response, delayed development and increased maternal and infant mortality. Most affected populations are women and children living in developing countries, as their diets provide less available iron as well as malaria and other infections compound the problem by increasing loss **(Trowbridge, 2002).**

Iron deficiency is one of the most common widespread nutritional disorders, affecting large number of children in developing countries, it is the only nutrient deficiency which is also significantly prevalent in virtually all industrialized nations. About half of the pregnant women in the world are estimated to be anemic (52% in non-industrialized and 23% in industrialized countries) **(WHO, 2001).**

In the Eastern Mediterranean Region, iron deficiency anemia remained a public health problem. The prevalence of anemia in women of childbearing age ranged from around 20% in Jordan, parts of Egypt and parts of Oman to more than 60% in countries like Djibouti. Children were more affected than women; the prevalence was more than 60% in many countries **(Bagchi, 2004).**

In Egypt, about three in ten children suffer from some degree of anemia. This is similar to the level that was found among women. Anemia is mild in many cases, however, 11 % of young children had a moderate level of anemia, and a small proportion was classified as severe anemic. Children less than 2 years were more likely to be anemic. Rural residence children

were more likely to be anemic than urban ones (33 % and 24 %, respectively). Considering the variation by socioeconomic characteristics, the greatest variation in overall level of anemia (including mild as well as moderate and severe anemia) is observed by place of residence. The children 6-59 months in rural Upper Egypt have the highest anemia levels (38%), and children in urban Lower Egypt have the lowest levels (23 %). Looking at the mother's education level, children whose mothers never attended school have the highest anemia level and children whose mothers completed at least secondary school have the lowest level (25 and 33 %, respectively) **(El-Zanaty & Way, 2004).**

Full term newborns are normally born with adequate iron stores in the liver and hematopoietic tissue, because of destruction of fetal red blood cells soon after birth. Breast-milk is relatively low in iron, although the iron in breast milk is much better absorbed than that in cows' milk. Iron deficiency commonly develops after six months of age if complementary foods do not provide sufficient absorbable iron, even for exclusively breastfed infants.

Mild to moderate iron deficiency has adverse functional consequences. Iron deficiency affects cognitive performance, behavior, and physical growth of children. Immune status and morbidity from infections of all age groups and the use of energy sources by muscles and thus the physical capacity and work performance of adolescents and adults of all age groups **(WHO, 2001).**

Efforts have been invested in reducing iron deficiency, in parallel with task force to improve intakes of other micronutrient (vitamin A and iodine). The progress in reducing iron deficiency is still limited,

especially compared with efforts to reduce deficiencies of other micronutrients **(Yip, 2002).**

Importance of the Study:

Although the impact of iron deficiency on health has long been recognized by nutrition and health professionals, efforts to address the problem have been limited by a number of inter-related factors. These factors include low awareness of the problem on the part of the public and policy makers, limited evaluation of program effectiveness to confirm the impact of intervention and identify the key factors associated with program success, and limited financial and human resources to initiate and sustain effective interventions.

Relations to goals of the department (Growth & Development):

Since iron deficiency affects cognitive performance, behavior, immune status and physical growth of children. Assessment of the effectiveness of the national Egyptian school nutrition programs in preventing iron deficiency anemia in young children can be instrumental in the prevention of the reversible and irreversible adverse effects of iron deficiency anemia in Egyptian children.

Definition and Concepts of the Study:

Effectiveness refers to the intervention's ability to do more good than harm for the target population in a real world setting.

Iron deficiency anemia is a decrease in the number of red blood cells, caused by a lack of iron. Iron deficiency anemia is the most common form of anemia. Iron is an essential part of hemoglobin, the oxygen- carrying protein in blood. Iron comes from the diet and by recycling iron from old red blood cells.

School Nutrition Program: School nutrition programs in public schools in Egypt are supervised and provided by the Ministry of Education to many public elementary schools on a national level. In many schools it consists of a school pie/biscuit filled with a paste of dried dates of iron fortified flour.

Aim of the Study