

Prevention and Management of Iron Deficiency Anemia among Students in Kasr Al Ainy

Secondary School of Nursing

(Family Medicine Based Approach)

Thesis

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وَقُلْ إِعْمَلُوا فِى سَبِيلِ اللَّهِ
عَمَلَكُمْ وَرَسُولِهِ
وَالْمُؤْمِنُونَ

(التوبة : 105)

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Abstract

Objectives: To promote the nutritional health status among adolescent Nursing School girls in Faculty of Medicine, Cairo University and clarify the role of family physician in providing a comprehensive care for iron deficient adolescent girls from a family practice point of view.

Methods: The study was cross sectional interventional study, carried out at Kast Al Ainy Secondary School of Nursing during the academic year 2010/2011.

Results: The mean age of adolescent nursing school girls was 16.3 ± 0.5 years, the mean body mass index was 20.2 ± 1.7 kg/m². The results of HB assessment show that more than two fifths of studied sample (47.0%) were anemic. After health education sessions, there was a significant improvement in knowledge concerning causes, symptoms, prevention of IDA, sources, absorption of iron and about proper timing for intake of daily dose of iron supplements from 5.3 ± 1.5 to reach 9.3 ± 0.9 .

Conclusion: The study concluded that more than three fifths of adolescent Nursing School girls change their style of eating after health education and nutritional care is the first line for prevention of IDA.

Key words: (Iron, Hemoglobin, Iron deficiency, Iron deficiency anemia, Adolescents, Nutritional education, Nutritional care, Iron supplementation, Iron fortification, Knowledge)

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List of Abbreviations

AAP	American Academy of Pediatric
AI	Adequate Intake
AMDR	Adequate Macronutrient Distribution Ranges
AMDR	Adequate Macronutrient Distribution Ranges
BMI	Body Mass Index
CDC	Center of Disease Control and Prevention
DRI	Daily Reference Intake
EAAPP	Egypt Adolescent Anemia Prevention Program
EDHS	Egypt's Demographic Health Survey
EER	Estimated Energy Requirement
EHDR	Egyptian Human Development Report
ERF	Economic Research Forum
FAO	Food and Agriculture Organization
FEP	Free Erythrocyte Protoporphyrin
FFQ	Food Frequency Questionnaire
GAIN	Global Alliance for Improved Nutrition
Hb	Hemoglobin
Hct	Hematocrite
HIO	Health Insurance Organization
ID	Iron Deficiency
IDA	Iron Deficiency Anemia
IFA	Iron Folic Acid supplementation

MCV	Mean Corpuscular Volume
MOHP	Ministry of Health and Population
NAAC	National Anemia Action Council
NCHS	National Center for Health Statistics
NNI	National Nutrition Institute
NRC	National Research Center
RBC	Red Blood Cells
RDA	Recommended Dietary Allowance
SHIP	Student Health Insurance Program
TIBC	Total Iron Binding Capacity
UNICEF	United Nations International Children Emergency Fund
USAID	United States Agency for International Development
WFP	World Food Program
WHO	World Health Organization

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INTRODUCTION

Anemia is defined as a low hemoglobin (Hb) concentration in blood, or less often, as a low hematocrite (Hct) value (**Brittenham, 2008**). Nutritional anemias are caused when there is an inadequate body store of specific nutrient needed for Hb synthesis (**Siddiqui and Siddiqui, 2008**).

Iron deficiency (ID) is prevalent in infants, children and adolescents worldwide due to their high iron requirements during growth, low dietary iron intake and low-bioavailability diet (**Andersson and Hurrell, 2010**).

Iron deficiency anemia (IDA) is the most common micronutrient deficiency in the world (**Paulman, 2012**). And is the most common cause of anemia in adolescents and research reports a prevalence of up to 24%, with frank anemia noted in 10% (**Patel, 2009**).

Iron deficiency affecting approximately 30% of the world's population in 1992 (**World Health Organization WHO, 1992**). And more than 2 billion individuals suffer from anemia estimated about 40% of the world's populations (**Dreyfuss and Stoltzfus, 1998**).

About one fifth of the world's population (20%) suffering from iron deficiency anemia (**WHO, 2000a**) and (**Chen et al, 2005**).

WHO and Center of Disease Control and Prevention (CDC) 2006, estimated that anaemia affects 1.62 billion people which corresponds to 24.8% of the population (**Benoist et al, 2006**).

IDA is more prevalent in developing countries where reduced work capacity, less income earned, higher levels of poverty and food insecurity (*Klemm et al, 2011*). And more prevalent in Egypt, because of complex economic and social problems, malnutrition, and infections sometimes triggered by hookworm (*Mukhtar, 2011*).

A survey conducted in 1999, found that thirteen million people; 22% of the Egyptian population are currently adolescents, 47% of them were anemic. The preliminary results from *Egypt's Demographic and Health Survey (EDHS)* conducted in 2000 showed that 30% of adolescents were anemic (*El- Zanaty and Way, 2001*).

Anemia constitutes a major public health problem in **Egypt** and needs urgent intervention. A national iron supplementation program to prevent anemia among adolescents was recommended.

The **WHO** recommends weekly supplementation for adolescent girls and women of reproductive age. Weekly dose of iron and folic acid, aims to improve and maintain the iron status of females prior to conception. All adolescent girls and non pregnant women be supplemented with 60 mg iron once or twice weekly and 400 ug folic acid should be included with the iron supplementation for the prevention of birth defects in those who become pregnant (*Dreyfuss and Stoltzfus, 1998*), (*WHO, 2009*) and (*UNICEF, 2010*).

The National Program of iron supplementation started in **Egypt** by the year 2000. The program aimed at control iron deficiency anemia (IDA) among adolescents. Ministry of Health and Population (MOHP), Health Insurance Organization (HIO), Student Health Insurance Program

(SHIP) through the United States Agency for International Development (USAID) and The Manoff Group seeks to reduce current anemia rates and to prevent anemia in preparatory and secondary schools students in five governorates in Upper Egypt.

Approach was adopted for this program: supplementation, diet improvement through nutrition education and parasitic control. The supplements distributed at the schools contained 200 mg ferrous fumarate and 300mcg folic acid once a week as recommended. Rates were measured over 4 months at the end of the 2000 school year and 20% drop in anemia rates among school-attending adolescents occurred (**MOHP and HIO, 2002**).

In spite of these efforts, the **EDHS 2005**, showed elevated level of IDA prevalence among adolescents higher than reported in **EDHS 2000**. **EDHS 2005** shows that the prevalence of anemia in Egypt among adolescent females, was around one third of females age 11-19 were anemic (**El-Zanaty and Way, 2001 and 2005**) (prevalence of anemia among adolescent females not mentioned by EDHS 2008) (**El-Zanaty and Way, 2009**).

So more researches is required to promote prevention and management of IDA.