

Mothers' Awareness regarding Iron Deficiency Anemia among School Age Children: An Assessment study

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Abstract

Background: The anemic condition is commonly experienced in children globally. Lack of essential iron in the body contributes to anemia that has been recognized to great challenges. Thereby, adequate knowledge about the iron deficiency anemia and determine the weak point of awareness of mothers, **This study aimed** to assess mothers' awareness regarding iron deficiency anemia among school age children. **Design:** A descriptive research. **Subject:** A purposive sample composed of 114 primary school students and their mothers. **Tools:** two tools, 1) A structured interviewing questionnaire to assess mothers' knowledge and reported practice. 2) Awareness Scale to assess mothers' awareness regarding iron deficiency anemia. **Results:** more than half of studied mothers were poor knowledge and reported practice respectively. Also, less than half of mothers' were poor awareness. **Conclusion:** There was a positive correlation between mothers' knowledge and mothers' awareness. **The study Recommendations:** integration of nutrition education into health agencies.

Keywords: mothers' awareness, iron deficiency anemia, school age student.

Introduction

Iron deficiency anemia is the most common form of anemia, and this typically presents as the microcytic anemia characteristic of iron deficiency anemia (*Camaschella, 2015*). It can occur as comorbidity in association with a number of different chronic illnesses including kidney disease, cancer, heart failure, and inflammatory bowel disease (*Jimenez et al., 2015*).

Anemia has been an epidemic affecting several age groups. According to world health organization report, at least 25.4% school-aged children are anemic. The national campaign aims to help parents identify these problems in early childhood to allow them to seek treatment for their children and better their health (*Ministry of Health and Education, 2019*).

The cause of iron deficiency anemia varies greatly, it can result from poverty, inadequate intake (resulting from an ignorance of which foods to choose, or a high consumption of iron-poor foods), increased needs, poor absorption, mineral excesses, or containments. High sugar and fat intakes are

often associated with low iron intakes; blood loss is the primary non nutritional cause, especially in poor regions of the world where parasitic infections of the gastrointestinal tract may lead to blood loss (*DeBruyne and Pinna, 2014 & Assefa et al., 2014*).

School-age children more vulnerable for anemia, especially for iron deficiency. Consequences of anemia in school-age children are poor psychomotor development, negative last-longing effects on central nervous system, poor Intelligence Quotient (IQ), poor school performance, reduced work capacity, and poor quality of life (*Tezera et al., 2018*).

Lack of awareness among the mothers about the problem coupled with their low educational status, poor nutritional practices and unhealthy food habits, low iron bioavailability of the diet, decreased physical activities, malaria and parasitic infestations are additional factors associated with lower hemoglobin level in children (*Assefa et al., 2014*).

Nursing management of the child with iron deficiency focuses on promoting safety,

ensuring adequate iron intake and educating the family. Promoting safety the child with anemia is at risk changes in neurologic functioning related to the decreased oxygen supply to the brain. This can lead to fatigue and inability to eat enough. Providing dietary intervention limit fast food consumption and encourage intake of iron rich foods such as red meats, tuna, dried beans, dried fruits, leafy green vegetables. Teach the parents about dietary intake and encourage them to provide a variety of foods for iron support and vitamins and other minerals necessary for growth (*Padmaja, 2016*)

Significance of the study

Based on World Health Organization (WHO) report, anemia affects 45.7 to 49.1% of school-age children in the world and prevalence of anemia among school-age children in Africa ranged from 64.3 to 71% (*Tezera et al., 2018*).

The prevalence of anemia in African countries, such as Kenya (28.8–35.3%), West Africa (23.8%), Mali (58%), Tanzania (57%), Ghana (41%), Sudan (88.3%) and Egypt (59.3%) among school-age children (*Getaneh et al., 2017*).

According to increase prevalence of iron deficiency anemia among school age children and lack mothers' awareness, It's important to carry out this study to shed light on mothers' knowledge and skills regarding iron deficiency anemia that consequently can help in better quality of life and increase the awareness of schools children and their mothers.

Aim of the Study

The aim of the study is to assess mothers' awareness regarding iron deficiency anemia among school age children.

Research questions:-

- 1- What is the level of mothers' knowledge regarding to iron deficiency anemia?
- 2- To what extent the awareness of mothers about iron deficiency anemia?

- 3- Is there relation between characteristics of the mothers and their knowledge and practice regarding iron deficiency anemia?

Subjects and Methods

Subjects and methods of this study were portrayed under four main topics as follows:

I-Technical Design:

Research design:

A descriptive design was used in this study.

Settings:

This study will conduct in Bulaq El-Dakror district affiliated Bulaq Educational Administration in Giza governorate affiliated to the Ministry of Education. The primary schools in Bulaq district namely:

- Mostafa Kamel primary school
- El Shahid Magdy Mohamed Hassan primary school

Sample:

Purposive sample and multi stage random sample technique will be used in this study.

Sample technique and sample size:-

1st stage: Two schools will be chosen randomly from 10 government primary school in rural area of Bulaq El-Dakror primary schools (Mostafa Kamel primary school and El Shahid Magdy Mohamed Hassan primary school) in Giza governorate.

2nd stage: Two classes will be selected from two schools of government primary schools.

3rd stage: All Iron deficiency anemia children who are attending in the 2 schools government mentioned will be included in the students number of two classes governmental under the following inclusion.

Criteria:

A- Age: school age children 11-12 (6th grade) regardless their gender.

B- Confirmed diagnosis of Iron deficiency anemia for at least 6 month.

A total available sample numbers of school age children were 114 child at two setting according to inclusion criteria (Mostafa Kamel primary school had 62 child and El

Shahid Magdy Mohamed Hassan primary school had 52 child had Confirmed diagnosis of Iron deficiency anemia for at least 6 months.

Tools of data collection:-

Two tools used for data collection:-

1) Interviewing Questionnaire Sheet:

It was designed by the researcher after reviewing the related literature and reviewed by supervisors. It was written in an Arabic language for gathering data in relation to the following parts:

Part I: Concerned with the characteristics of study subjects:

- Studied students' characteristics which included; age, gender, level of education and training courses. Also, assessment of the studied children according to their body mass index

- Accompanying mothers' characteristics which included; age, educational level, job, social status, monthly income of family.

- Housing condition of studied sample included; home type, room number, sibling number who share a sleeping room, enough window, safe water sanitation, and electricity. The questionnaire consisted of 8 closed ended questions inform multiple choice question (MCQ).

- **Part II:** Medical and family history which included; type of family, place of residence, number of children in family, members of family, previous health problems during pregnancy and current health problems in students. Question consisted of 6 closed ended questions inform multiple choice question (MCQ).

- **Part III:** It concerned with studied mothers' knowledge regarding meaning of anemia, most age affected, causes, signs and symptoms, prevention, complication, normal level of hemoglobin and methods treatment. The questionnaire consisted of 16 closed ended questions inform Multiple Choice Question (MCQ) and 1 open ended question.

❖ Scoring system:

Each knowledge item with a correct response will scored 1 and the incorrect will scored zero, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score. These scores were converted into percent scores, and the mothers' total knowledge was considered:

- **Good:** if the percent score was $75 < 100\%$
- **Average:** if the percent score was $50 < 75\%$
- **Poor:** if the percent score was $< 50\%$
- **Part IV:** it concerned with studied mothers' reported practice regarding: dealing with their children suffering from iron deficiency anemia, nutrition of children, place of management, recurrent and retreatment, food supplementary, dealing during the complication of anemia such as: elevate the heart rate, restarted growth, recurrent infection, selection of appropriate foods to prevent iron deficiency anemia occur, continuous check up every six months and follow up and appropriate method of treatment.

❖ Scoring system:

- Regarding the scoring system for reported practicing of the studied mothers, the question was assigned to score according to its number of sub item. Each step answered correctly was scored 2 while each step answered incorrectly or not answered was scored 1. The total mothers responses are categorized into done $\geq 60\%$ and not done $< 60\%$.

- Second tool: Mindful Attention Awareness Scale (MAAS) (Appendix III):

- It was adopted by the researcher based on Brown & Ryan, (2003); it revised by supervisors and was used to assess mothers' awareness regarding iron deficiency anemia. Which included (19) questions, it divided into Always=2, usually=1, and never=0. Sum sores were calculated to obtain the total awareness

score. Total mothers' awareness score was divided into:

- Good awareness: if the score more than 75%.
- Average awareness: if score from 50% to 75%.
- Poor awareness: if score less than 50%.

II-Operational Designed:

The operational design includes preparatory phase, content validity & reliability and Pilot study.

• Preparatory Phase:

It includes review of related literature and theoretical background of aspects of the study using books, articles, periodical, internet and magazines was done to develop the study tools and the various aspects of the research problem.

Validity and Reliability:

Tools validity was checked through distribution of tools by jury composed of three experts in the field of the study; content validity was assessed to determine whether the tool covers the appropriate and necessary content, as well as its relevance to the aim of the study, clarity and its simplicity. The suggested modification was done and the final form was stated. Test the reliability was conducted for study tools, the Cronbach's Alpha test was found at (0.960).

Ethical Considerations:-

The research approval was obtained from the Faculty Ethical Committee before starting the study. The researcher was clarified the objectives and aim of the study to mothers included in the study before starting. Verbal approval was obtained from the mothers before inclusion in the study; a clear and simple explanation was given according to their level of understanding. They secured that all the gathered data was confidential and used for research purpose only. The researcher was assuring maintaining anonymity and confidentiality of subjects' data included in the study. The subjects were informed that they are allowed to choose to participate or not in the

study and they have the right to withdrawal from the study at any time.

• Pilot study:

A pilot study was conducted on 114 mothers those represent 10% of studied sample who were selected from the primary schools, the pilot study was done to ascertain the relevance of tool, to test the word of questions, clarity and applicability of the tools to estimate the average time needed to fill in the questions. According to the results of the pilot, no corrections and omissions of items were performed so the pilot mothers were included in the main study sample.

• Field Work:-

Data were collected within three months, from the beginning of October 2019 to the end of December 2019. The researcher first met with the mothers and students at the previously mentioned settings, explained the purpose of the study after introducing himself.

The researcher was visiting the study settings 2days / weekly Sunday and Monday in Mostafa Kamel school and Tuesday and Wednesday in El Shahid Magdy school by rotation at morning (8a.m-1p.m) to collect data. The questioner for knowledge was filled by mothers who take 10-15 minutes, while the awareness scale checked by the researcher the time consumed for filling the awareness sheet around 10 minutes.

III- Administrative Designed

An official approval letter to conduct the study obtained from Dean of faculty of nursing affiliated to Ain Shams University to directors of the previously mentioned setting. The researcher met the director and explained the purpose and the methods of the data collection, to obtain an approval for collecting the data from selected schools.

IV. Statistical Analysis

Data collected from the studied sample was revised, coded and entered using Personal Computer (PC). Computerized data entry and

Statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) version 22.

Data were presented using descriptive statistics in the form of frequencies, percentages. Chi-square test (X^2) was used for comparisons between qualitative variables. Spearman correlation coefficient measures the strength and direction of association between two ranked variables.

Results:

Table (1): reveals that 59.7% of studied mothers their age were less than 30yrs, 67.5% of them at intermediate education, 91.2% of them were not working. In addition, 93% of them were married and 83.3% their income was not enough.

Table (2): reveals that, less than half (45.6%, 46.5% & 42.1%) of studied mothers were poor knowledge regarding meaning of anemia, signs & symptoms, complication and treatment. Approximately, half of them (50.9%) of them were poor knowledge regarding child age affected. Also, 72.8% of them were poor knowledge regarding normal level of hemoglobin. While, less than half (40.4%

&47.4%) of them were average knowledge about causes and way of prevention of anemia.

Figure (1): shows that, 56.1% of studied mothers were poor knowledge regarding iron deficiency anemia, 30.7% of them were having average knowledge, and only 13.2% were good knowledge regarding iron deficiency anemia.

Table (3): shows that less than half (43.9%) of the studied mothers had poor awareness about iron deficiency anemia, while more than one third (36.8%) of them had average awareness and the rest of them (19.3%) had good awareness regarding iron deficiency anemia.

Table (4): represent the highly statistically significant differences ($P<0.01$) between total mothers' knowledge about caring of children with iron deficiency anemia and total mothers' practices.

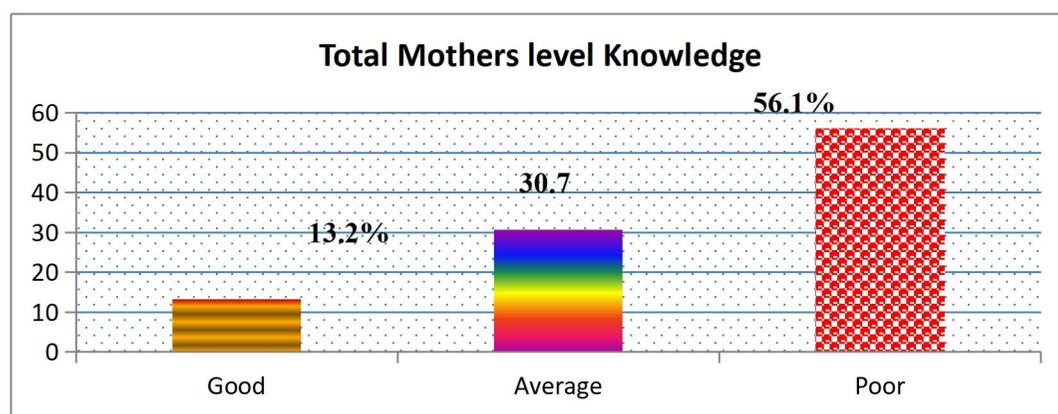
Table (5): illustrated that, there was positive correlation between studied mothers' total knowledge and their total practices regarding caring of children with iron deficiency anemia $p=000$. Meanwhile, there was positive correlation between mothers' total knowledge and their total awareness regarding to care of children with iron deficiency anemia.

Table (1): Distribution of the studied mothers according to their socio-demographic characteristics (n=114)

Item	No.	%
Age in years		
• Less than 30	68	59.7
• From: 30: less than 40	38	33.3
• From 40 years and over	8	7.0
The educational level:		
• Illiteracy	8	7.0
• read and write	15	13.2
• Intermediate Educ.	77	67.5
• University degree	14	12.3
Mother's Job		
• working	10	8.8
• not working	104	91.2
Social Status:		
• Married	106	93.0
• Divorced	8	7.0
Monthly family income		
• Enough	19	16.7
• Not Enough	95	83.3

Table (2): Distribution of the studied mothers according to their knowledge about iron deficiency anemia (n=114).

Items knowledge	Good		Average		Poor	
	No	%	No	%	No	%
Meaning of anemia	24	21.1	38	33.3	52	45.6
the most prevalent age group for the disease	12	10.5	44	38.6	58	50.9
Signs & symptoms of anemia	25	21.9	36	31.6	53	46.5
Cause of anemia	26	22.8	46	40.4	42	36.8
Ways to prevent anemia	22	19.3	54	47.4	38	33.3
Complication of anemia	27	23.7	39	34.2	48	42.1
Normal level of hemoglobin in blood anemia absorption	3	2.6	28	24.6	83	72.8
Methods of treatment	26	22.8	40	35.1	48	42.1

**Figure (1):** Distribution of the study mothers according to their total score level knowledge about iron deficiency anemia (n=114).**Table (3):** Distribution of the studied mothers' regarding their total awareness regarding iron deficiency anemia (n=114)

Mothers' awareness	No.	%
Good	22	19.3
Average	42	36.8
Poor	50	43.9

Table (4): Relation between total mothers' knowledge and their total practice regarding care of children having iron deficiency anemia (n=114).

Total Mothers' knowledge	Total mothers' practices				Total	X ²	P – value
	Done(n= 50)		Not done(n= 64)				
	No.	%	No.	%			
Good	5	10.0	10	15.6	15	19.188	<0.01**
Average	12	24.0	23	36.0	35		
Poor	33	66.0	31	48.4	64		

Statistically significance, (P) >0.01

Table (5): Correlation between total awareness, practices of the studied mothers and their total knowledge regarding to iron deficiency anemia.

Item	Total knowledge	
	r.test	P-value
Total practices	0.521	.000**
Total awareness	-0.499	0.001*

(* significant <0.05 (** statistically significance, (P)>0.01

Discussion

Iron Deficiency Anemia is the most widespread and common nutritional problem in the world. In spite of the efforts of sustainable goals to decrease the frequency, the prevalence in different parts of the world with higher rates in the developing countries **Achouri et al., (2017)**. The high prevalence of iron deficiency anemia in developing countries is associated with poor sanitation conditions, low socio-economic, restricted access to food and lack of knowledge for good dietary practices; it affects the physical and mental development of children and decreased concentration capacity (**Mamdooh, 2018**).

This study aimed to assess mothers' awareness regarding iron deficiency anemia among school age children.

In relation to the studied mothers' characteristics regarding level of education and occupation, the present study cleared that, more than two thirds were having intermediate degree of education and the majority of them were housewives and married. This finding matched by **Ali et al., (2020)** who conducted a study about "Parents' awareness on iron deficiency anemia in children" in Saudi Arabia and reported that the educational level is an important determinant for caring children with iron deficiency anemia. Also, results came in the line with **Moreno, et al., (2018)** who conducted a study to assess how family socioeconomic status, peer behaviors, and school-based intervention on healthy habits influence adolescent's eating behaviors and reported that 35% of mothers have a medium educational level and low socioeconomic standard, illiteracy, and 7% educational level of

mothers and fathers significantly increased the risk for iron deficiency anemia. From the research point of view there was a relationship between education of the mother and anemia in children.

Furthermore, the present study illustrates that the majority of studied families had unsatisfactory income. The association between the occurrence of iron deficiency anemia and the low income, which had higher prevalence of vitamins and mineral disorders, may be explained as iron deficiency anemia was highest among lower economic class. The result came consistent with **Adams et al., (2016)** "Child food insecurity and iron deficiency anemia in low-income" in the United States and mentioned that, low income often correlates with limited access to a variety of food and causes malnutritional diseases.

As regards the studied mothers' knowledge about iron deficiency anemia, the present study declared that less than half of them had poor knowledge regarding meaning of anemia, signs & symptoms, complication and treatment. This result was similar with result of **Yuseff, Daud & Ahmad (2016)**, "Nutrition education and knowledge, attitude and hemoglobin status of Malaysian children" and found that the less than half of the mothers were unaware about anemia and believe that anemia could be the result of witchcraft and eating lemons. Meanwhile this result was inconsistent with result of **Shahzad et al. (2017)**, who carried out a study entitled "Impact of knowledge, attitude and practice on iron deficiency anemia" in Pakistan and reported that respondents subjects have adequate knowledge regarding symptoms, complications and treatments. Some mothers recognized that

childhood anemia could have life-long implications for their children. The researcher believes that adequate mothers' knowledge come from reading in health care topics and good experience.

Concerning the finding of the current study of studied mothers' knowledge regarding child age affected, half of them were poor knowledge. Also, near to three fourth of them were poor knowledge regarding normal level of hemoglobin. While, less than half of them were average knowledge about causes and way of prevention of anemia. This result were came in the line with **Al-Zain, (2017)** who studied "Impact of socioeconomic conditions and parasitic infection on hemoglobin level among children" in Gaza Strip and reported that the prevalence of anemia increased among male children aged from 6 – 12 years. Similar study about Maternal Health and Knowledge and child Health Outcomes in Kenya, done by **Miller, (2018)**, who reported that there was limited awareness of mothers related to caring for their children's anemia and normal level of hemoglobin. While, **Shahzad et al., (2017)**, mentioned that more than half of studied subjects had good knowledge about the symptoms of anemia; knew its causes; knew about prevention and iron rich food source; knew about the foods and beverages that aided or hindered the absorption of dietary iron (**Hockenberry & Wilson, 2018**), who stated that great majority of children are preventable with proper food rich in iron and the use of other preventive measures. From the researcher point of view it is important implement the prevention strategies for school children.

Regarding studied mothers' total knowledge regarding iron deficiency anemia. The current study showed that more than half of them had poor knowledge, third of them had average knowledge and slightly of them had good knowledge. This result came in agree with **Koo, et al., (2018)** studied "Knowledge, attitudes and practices of school students toward iron deficiency anemia and nutritional outcomes in Malaysia" and stated that more than two

thirds of the studied sample had good knowledge about iron deficiency anemia and healthy nutritional pattern. This difference may could be due to change of culture between countries.

Based on the study conducted, the level of total awareness about iron deficiency anemia, it was recognized that less than half of the interviewed mothers asserted that poor level of total awareness regarding to iron deficiency anemia, While more than one third of them had average level of total awareness and the rest of them had good awareness regarding iron deficiency anemia. This finding was inconsistent with result in similar to the study of **Al Shidi (2016)** who conducted a study to explore the mothers' level of awareness in relation to prevention and management iron deficiency anemia in Oman and revealed that, mothers had a low level of knowledge regarding management and prevention of iron deficiency anemia. Also this result in the same line with the study of **Hassan (2018)**, who found that only 2% of mothers had good awareness before intervention and the majority of them had good awareness after intervention. On the other hand, this awareness level was lower than those reported by **Alzohairy, (2018)**, who conducted a similar study entitled "Awareness of anemia causes among the Saudi population" in Qassim Region, Saudi Arabia where the awareness was 89.5% and the remaining 10.5% were not aware. From the researcher point of view early prevention educational program required to increase the health awareness for mothers and children.

The current study showed that, there were highly statistical significant differences between total practices of the studied mothers about caring of children with iron deficiency anemia and their education level and social status. Moreover, there was a statistically insignificant difference between total practice of the studied mothers and their age & job. this result come in the line with **Shariff et al., (2017)** who carried out a study entitled "Nutrition education intervention improves

nutrition knowledge, attitude and practices of school children" and reported that there were statistically significant relation between the mothers education and their skills in caring of children. When the mothers have more high level of education, they become more experiences in caring of children with iron deficiency anemia. This may be related to that the mothers may needed to educational training regarding caring their children and improve their experiences.

The results of the present study illustrated that, there was highly statistically significant differences between studied mothers' total knowledge and their total practices regarding to care of children with iron deficiency anemia. This result was agree with **Jordao et al. (2016)**, who carried out a study entitled "Prevalence of iron deficiency anemia" in Brazil and mentioned that a strong relation between total knowledge scores and total practices scores. Additionally the result come in the line with **Hassan & Khalique (2016)**, who carried out a study entitled " Health status and anthropometric profile of school going children (5-15 years) in Aligarh city" and mentioned that there is a significant relation was found between knowledge and practices.

Regarding Correlation between total awareness, practices of the studied mothers and their total knowledge among iron deficiency anemia. The results of the present study illustrated that, there was positive correlation between studied mothers' total knowledge and their total practices regarding to care of children with iron deficiency anemia. Meanwhile there was negative correlation between mothers' total knowledge and their total awareness regarding to care of children with iron deficiency anemia. This result was agree with **(Aboud, El Sayed, & Ibrahim, 2019)**, who carried out a study entitled "Knowledge, attitude, and practice regarding prevention of iron deficiency anemia among pregnant women" in Tabuk Region, Saudi Arabia, and mentioned that a weak correlation between total Knowledge scores and total awareness scores. Additionally, the result

come in the line with **Ritu et al. (2017)**, who carried out a study entitled "A study on anemia prevalence in children of an Indian Island" and mentioned that there is no significant correlation was found between knowledge and awareness.

Regarding Correlation between total awareness of the studied mothers' and their total practice regarding to caring of children with iron deficiency anemia, this result showed that negative correlation between studied mothers total knowledge and their awareness this result disagree with **Ali et al., (2020)**, who mentioned that a positive association between mothers' knowledge, awareness and practice toward caring of children with iron deficiency anemia.

Conclusion:

Based on the results of the present study, it can conclude that:

Mothers had poor level of knowledge regarding iron deficiency anemia. Although more than half of mothers had not done reported practice. There was a positive correlation between total knowledge of iron deficiency anemia and their total awareness.

Recommendations:

In the light of the study finding, the following recommendation is suggested:

- 1- Integration of nutrition education into health agencies to enhancement the awareness of mothers.
- 2- Involve teachers, school personnel, parents, communities, and local government in the development and implementation of school nutrition programs.
- 3- Provide school based nutritional programs by school nurses for the students and their mothers, aiming to improve nutritional pattern through health educational instructions.
- 4- Nutritional education should always employ a wide range of hands-on teaching/ learning methods that can be applied through mass

media of schools also, contact with mothers through mobile and internet.

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