Nutritoinal Pattern among Primary School Children with Iron Deficiency Anemia

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Abstract

Background: - anemia in school-age children is an important public health problem; it reduces physical work capacity and cognitive function and adversely affects learning and scholastic performance. **Aim:** the study aimed to determine the nutritional pattern among primary school children with Iron deficiency anemia. **Design:** descriptive study design was used. **Setting:** the study was conducted at Ismailia outpatient clinics of health insurance. **Sample:** the school children attended with their parents to pervious setting through 6 months with inclusive criteria. **Tools**: three tools were used, 1st tool: interviewing questionnaire which included 5parts, 2nd tool was medical record analysis, 3rd tool was anthropometric measurement. **Results:** the study revealed that 53.9 % of the studied parents had poor total knowledge& 30.4% of them had average total knowledge about iron deficiency anemia while only 19.2% had good total knowledge regarding appropriate diet for primary school children. The study revealed that 76.5%of studied students did not have breakfast before going to school 52.2%and 73.9% of them take soft drink, and pastimes between meals. There was positive relation between total reported practices of parents about caring of children and their level of education p<0.05 and there was positive relation between parents' total knowledge and their reported practices regarding care for their children at p<0.01.**Conclusion**: nutrition pattern, parents knowledge and practices mainly related to health of children with iron deficiency anemia. **Recommendations**: A program should be implemented especially by the Ministry of Health, the Ministry of Education, targeting both children and their parents through different public media approach focus on the nutritional pattern and behavior needs of this group.

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Key words: Nutritinal Pattern ,Primary School Children , Iron Deficiency Anemia

1.Introduction

Iron, one of the vital nutrients present in red blood cells, aids in building immunity and boosts hemoglobin level which means less chance of contracting iron deficiency anemia. Lack of iron in the body can lead to iron deficiency anemia which further result in reduced oxygen carrying capacity, affecting various body function (**Hallberg&Asp**, **2019**).

Anemia is a condition in which the number of red blood cells or their oxygen - caring capacity is insufficient to meet physiologic needs, which vary by sex, attitude, and health**.** Iron Deficiency Anemia is a condition in which the total iron content in the body is decreased blow a normal level that affects hemoglobin synthesis. As a result, RBCs become pale and small **WHO, (2019).**

Iron deficiency anemia occurs when insufficient amount of iron is absorbed to meet the body's requirements. This inefficiency may be due to inadequate iron intake, to reduce bioavailability of dietary iron, to increased needs for iron, or to chronic blood loose. When prolonged iron deficiency leads to iron deficiency anemia **Schrier**, (**2019**). When iron deficiency occurs, hemoglobin concentration is reducing to below optimal level. When individual hemoglobin level are below two standard deviations (_2SD) of the distribution mean for hemoglobin in an otherwise normal population of the same gender and age who are living at the same attitude, iron deficiency anemia is considered to be present **WHO, (2018).**

Anemia is one of the world most wide-spread health problems, its affects more than 2 billion people worldwide-one-third of the world's population. And is a significant public health problem throughout the developing world. In almost developing countries, between one-third and one-half of the child population are anemic. In 2017 reports, the world health organization lists iron deficiency, a major causes of anemia, as one of top 10 risk factors in developing countries for "lost years of health life"(**Baker&Demaeyer,2019**).

Though iron deficiency is usually diagnosed and confirmed through a medical test, but some of common symptoms can help in detection and taking corrective measures. The symptoms of iron deficiency anemia are hair loss and dryness skin, fatigue and physical exhaustion, susceptibility to infection; lack of iron can weaken the immune system, restless legs, pica; it is an eating disorder that involves sudden urge to eat strange things with no nutritional value, difficulty in concentration, smooth or sore tongue, breath lessens (**Viteri&Torun**, **2019**).

Anemia etiology involves many factors, such as socioeconomic, nutritional biological, environmental and cultural characteristic. Its direct causes such as poor, insufficient, or abnormal red blood cell production: excessive red blood cell destruction; and excessive red blood cell loss. Contributing causes include poor nutrition, dietary quality, and health behaviors; adverse environmental condition; lack of access to health services; and poverty **Shop et al.,** (**2019**).There are various risk factors which may result in iron deficiency anemia, diet with poor bioavailability of iron, poor iron absorption, excessive blood loss, hookworm, parasitic infestation, hemorrhage, and trauma" inherited defects in hemoglobin synthesis or acquired disorders, deficit in other nutrients ,

e.g. vitamin B12, A, folic acid **Dallamanetal**., (**2019**).

Local dietary factors influencing the bioavailability of dietary iron, including both enhancers and inhibitors should be identified. Common practices in food selection and preparation (including: meal composition and preparation with respect to these factors). Appropriate dietary modification activities should seek to: increase, where possible, intakes of locally available harm_ iron food products, e.g. meat, liver, etc. increase intake of vitamin C_ rich foods and other foods that promotes iron absorption (e.g. fermented foods products).reduce as much as possible consumption of iron absorption inhibitors (e.g. phytate and iron -binding phenolic compounds)(**FAO**,&**WHO, 2017**).

A community health nurse should have complete knowledge regarding iron deficiency anemia, its causes, risk factors, sign and symptoms, prevention and management. She should know the function, sources and daily requirement of iron in the diet, a community health nurse carries out a complete assessment to now the magnitude of iron deficiency anemia through health surveys, routine screening and conducting research. She tries to found out the contributing factors responsible for iron deficiency anemia. She

helps in planning and administration of National Nutritional Anemic Prophylaxis Program on basis of data gathered **Puckree,(2017**).

1.1. Significant of the study:

Children are one of the vulnerable groups affected by anemia. Iron deficiency anemia impairs the cognitive development, immune mechanisms, and is associated with increased morbidity rates. The prevalence of anemia on school-age children in developing countries and developed countries was estimated about 42% and 17%, respectively. Anemia is an indicator of both poor nutrition and health **WHO,** (**2019**).

Iron deficiency anemia remains the largest nutritional deficiency worldwide and the main causes of disease. Globally, anemia affected 1.62 billion of people, which corresponds to 24.8% of population. The highest prevalence is in school-age children 47% (**Double Burden of Malnutrition2019**).

National Nutrition Institute with World Food Program in Egypt indicated that micronutrient deficiency, especially iron deficiency anemia, and are a public health problem among children, especially school children in Egypt, where the prevalence of anemia reaches 54% (**NNI, 2020**).

1.2. Aim of study:

The present study aimed to assess the nutritional pattern among iron deficiency anemic primary school children through:

❖ Assess parents' knowledge toward appropriate diet for their primary school children with iron deficiency anemia.

❖ Identify nutritional pattern among primary school children with iron deficiency anemia.

❖ Identify the parents' nutritional pattern for their primary school children with iron deficiency anemia.

1.3. Research question:

1- hat is the level of parent's knowledge regarding to iron deficiency anemia?

2- hat is the parent's knowledge toward appropriate diet for primary school children with iron deficiency anemia?

3- hat are nutritional pattern among primary school children with iron deficiency anemia?

4- s there relation between characteristics of socio-demographic of the parents and their knowledge and nutritional pattern among anemic primary school children?

2. Subject & Methods:

2.1 Research design: A descriptive study design was used to assess nutritional pattern among primary school children with iron deficiency anemia.

2.2. Setting: The study was conducted at outpatient clinics of health insurance of the Ismailia Governorate, which covers 175 primary schools affiliated to the management of the Ismailia educational area.

2.3 Subjects: The study sample were purposive sample, included All of Primary school children and their parents attend to pediatric outpatient clinics of health insurance of the Ismailia Governorate through six months were included in this study. They were 115 children 66 mal and 49 females accompanied with their parents. They were chosen according to inclusion criteria: Primary school children in previous setting, Boys and girls, having mild (10-12.9g/dl) or moderate (7-9.9g/dl) degree of anemia, free from congenital anomalies and accept to participate in study. Data collection was started and finished through six months starting from beginning of September 2020 to beginning of March 2021.

2.4 Tools for data collection:

Three tools were used.

First tool: Pre designed interviewing questionnaire developed by the researchers based on the recent related literature review, expert's opinion and researcher experience, which includes the following parts:

Part A: Socio-demographic characteristics students and their parents as age, academic level, rank, place of residence, gender, lives with whom, also characteristics of accompanying parents were seven question regarding age, level of education, job, social status, monthly income, family type, number of children in family, number of family member.

Part B: Nutritional pattern of anemic primary school children were included ten question regarding as: regular have basic meals (breakfast, lunch, dinner), meals contain all the necessary nutrients (grains-starches-vegetables-fruits), have breakfast at home before going to school, drink soft drink, tea, coffee or Nescafe, lunch contain various sources (protein, vegetable-carbohydrates-vitamins-minerals), regular time of dinner. Scoring were yes= (1) and No= (0).

Part C: -Parent's knowledge regarding iron deficiency anemia were included 10 question such as meaning of iron deficiency anemia, importance of iron for body, causes of iron deficiency anemia, symptoms, factors that causes iron deficiency anemia in children, complication, treatment and methods of prevention.

Part D:Parent's knowledge about proper nutrition regarding primary school children were10 question regarding as: food rich in iron, sources of plant iron, foods contain vitamin C, foods prevent iron absorption, types of daily products that children must eat, good sources of protein- carbohydrates-fats, maintain healthy weight for children. The Scoring system for parents' knowledge. It has been scored as good= 2, an average= 1 and poor =0 .According to the parent's responses the total parent's knowledge was considered: satisfactory (>75%) and unsatisfactory (<75%).

Part E: Parent's practice regarding their children with iron deficiency anemia include six question is, how did you deal with the children complain from iron deficiency anemia, what doing regarding feed of children, where do you go to a sick children to take treatment, what do you do if child doesn't get better. The scoring classified into done (>60%), not done (<60%).

Tool II: Medical record analysis: It was used to assess past and current medical history

regarding mother during pregnancy, labor and after delivery.

Tool III: Anthropometric measurement sheet: It was used to assess body math index (BMI) calculated, it was guided by **Gartaw, (2018)** and classified as children who obtained score <18.5 were considered to have less than normal body weight, 18.5_24.9 were considered normal body weight , 25_29.9 were considered more than normal body weight , 30_35were considered of obesity.

Tools Validity:

Content and face validity were performed by five professors of the Community Health Nursing Department of Faculty of Nursing- Ain Shams University, Egypt; they reviewed the tools for content accuracy.

Tools Reliability:

The reliability test of translated version was established by using the Cronbach alpha and Pearson correlation, which showed good internal consistency construct (Cronbach alpha = 0.887).

2.5 Pilot study

A pilot study was carried out after development of tools and using Arabic version of the questionnaire before starting the data collection, it was carried out on 10 children's

and their parents that attend to pediatric outpatient clinics of health insurance who were selected in order to: Test applicability, clarity and feasibility of tools, estimated the time need for data collection, find out any obstacles and problems that might interfere with data collection and make the required modification needed according to analysis of the results of that study. The subjects included in the pilot study were excluded from the study subjects.

2.6 Field work:

Approvals: An official letter from the Vice Dean of Suez Canal University for Education and Student Affairs was sent to the director of outpatient clinic in Ismailia City to facilitate research implementation. Then meeting was held with the director of pediatric clinic and director of nursing to clarify the purpose of the study and to gain their cooperation during data collection. Last an oral consent was obtained from each one to participate in the study, to set a date for data collection and to gain their cooperation during data collection.

• Data collection was started and finished at six months from beginning of September2020 to end of March 2021.

• The sample was collected during the period of students and their parents attending health

insurance clinic from Saturday to Thursday from 10 am to 3 pm.

● The structured interviewing questionnaire was filled by investigator from each participant in the study individually. It took about 20-30 minutes to be filled.

2.7 Ethical consideration:

The research approval was obtained from the scientific ethical committee in the faculty of nursing at Suez Canal University before starting the study. Permission has been obtained from each parent before conducting the interview and after giving a brief orientation to the purpose of the study. They were also reassured that all information gathered would be confidential and used only for the study. No names were required on the forms to ensure anonymity and confidentiality.

2.8 Statistical Design:

The data was collected, coded, and entered into a personal computer. It was analyzed with the program statistical package for social science (SPSS) version 20. Data were presented using descriptive statistics in the form of frequencies and percentages, description of quantitative variable as mean, SD, and range, description of qualitative variables as numbers and percentages and Chi-square test was used to compare qualitative

variable, paired t-test was used to compare quantitative variables in the same group and correlation coefficient test was used to rank different variables against each other either positively or inversely. Statistical insignificance was considered at P>0.05 and significance at P<o.o5.

3. Results:

Table (1) :shows that nearly half (40.9%) of the studied students were in age group 8>10years old with the mean age $\overline{X}\pm SD$ = 8.90± 1.11 years, about one third(33.9%) of them had third grade level of education ,as regard child ranking shows about one third(36.5%) of them were the first child in their families and more than half(52.2 %) of them had lived with father and mother .

Table(2): shows that, about 43.5 % of studied student's mothers & about 50.4% of fathers were in the age 30 >40 and (40.8 % &40%) of mother and father had University education respectively. About three quarter 73.9% of their fathers were working and 53.9% of the mothers were working. as regarding social status, the same table reported that 50.4% of the studied students' mothers were married and 53.9 of the studied students' fathers.

Table (3): shows that more than half (59.1%) of the studied students did not Regular time of the basic meals, all of them their meal did not contain all the necessary nutrient, more than half (52.2%) of the studied children had regularly drinks soft drinks did not eats breakfast at home before going to school, also about three-quarter (73.9%) of them candy / chips / fast food, while (47.8%) of them were regular time of the dinner

Table (4): reveals that medical history during pregnancy were about three quarter (73.9%)studied student's mothers age during pregnancy were ranged between 30 > 40 years, (59.1%) of mothers during pregnancy were followed by medically, and more than half (58.3%) &(29.6)of mothers have health problem and complain during pregnancy respectively. as regards medication taken during pregnancy 58.3 take medication of them,(26,9%) taken antibiotics. Furthermore, history of mothers during labor nearly three quarter (67.8%) of them delivered baby abnormal weight, (13%) of their children were suffering injuries. As regards child history post labor,(44.3%) of them were entering ICU neonates,(22.6%) of children suffering from difficulty breathing at birth.

Table (5): reveals that nearly one half (46.1%) of studied students were underweight,

and nearly one-third (32.2 %) were overweight while more than one-tenth (16.5%) only of them were obese weight according to their BMI.

Figure (1): illustrates that, less than half (40%) of the studied student's parents had satisfactory total knowledge and two-third (60%) of them had unsatisfactory total knowledge regarding iron deficiency anemia and proper nutrition for primary school children.

Figure (2): illustrates that, (30.4%) of studied parents had done total reported practice. While (69.6%) of them had not done total reported practice regarding their children with iron deficiency anemia.

Table (6): represent that there is as statistical significant differences (P<0.05) between total knowledge of studied parents about caring of children with iron deficiency anemia and their level of education and job, while there is no statistical significant differences (P>0.05) between total knowledge of studied mothers and their age and social status.

Table (7): represent that there is as statistically significant differences (P<0.05) between total reported practice of studied parents about caring of children with iron

deficiency anemia and their level of education, while there is no statistical significant differences (P>0.05) between total reported practice of studied parents and their age and socials status.

Table (8) shows that there was highly statistically significant difference between the studied parents' total knowledge and their reported practices regarding care for their children with iron deficiency anemia (p= <0.001).

4. Discussion:

Anemia remains one of the most prevalent public health problems in the countries of the Eastern Mediterranean Region with major consequence for human health as well as social and economic development. At least half of the anemic cases worldwide are due to nutritional iron deficiency **WHO, (2018).** Globally, it is estimated that tow billion people have iron deficiency, most of who live in developing countries. In Egypt is one of the developing countries that are facing the double burden of malnutrition, nutritional anemia is the most common type of it **Hassan et al.,(2018).**

Primary school children are a vulnerable period in the human life cycle for the development of nutritional anemia, especially for iron deficiency anemia because

of rapid growth rates and inconsistent eating habits. Primary school children are required to mention a balanced diet containing all food groups. Adequate nutrition at this age is essential to prevent health problems**Barid-Gunning,(2018).**

Regarding to socio-demographic data in the present study showed that, nearly half of studied student were in age group 8>10 years old with mean and stander deviation 8.90+-1.11. This finding is in contrast with study carried by **Assef et al., (2019).** Who conducted study on (135) participants about the "prevalence and severity of anemia among school children in Jimma Town, Southwest Ethiopia" which indicated that the prevalence of anemia among group of 6-8 years old was nearly half, while it was one third among the group age 8-10 years old.

The results of the present study showed that, those children from urban area had Iron deficiency anemia Twice as much as those from rural areas one-thirds from rural, nearly three-quarter from urban. This is similar to the result of stud carried out in Monoufia by **Nehad , (2015).** Who conducted study on (497) students about the "Epidemiology of iron deficiency anemia among primary school children 6-12 years in Monoufia Government" founded that the

prevalence of anemia among children living in urban areas was greater than that among children living in rural area around two third. This may be attributed to fact that urban families consume more fast food, which less nutritional value. As most mothers in urban area are busy in their work, so the children depend on fast food.

Regarding to the studied parent's educational level the current study showed that, less than one-half of mothers and fathers had university education. This result is in agreement with the study carried out by **AL-Othaimeen et al., (2019)** Who conducted study on (109) children about the "prevalence of nutritional anemia among primary school girls in Riyadh city, Saudi Arabia" showed that, low educational level was found to be high among parents of anemic primary school children more than half. This may be attributed to the lack of knowledge of basic food requirement and awareness' of food rich in iron.

This results also in line with finding by **EL-Derwiet al.,(2019),Choi,et al.,(2017) and Djokic et al.,(2018)** reported that mother educational level is an important determinant of anemia.

The result of present study revealed that, more than one-half of studied subjects born to working mothers . This result is in agreement with the study that carried by **Mohamed etal., (2019)** Who conducted study on (235) school-age children about the "prevalence of anemia and associated factors among school-age children in Al-Haramzone, Giza governorate, Egypt" which revealed that anemia was 41.4% among children born to housewife mother, and more than one half among children born to working mother.

This result is disagreement with a cross-sectional study was conducted in BongaTawen Southwest Ethiopia, carried by **Melkam et al., (2018)** Who conducted study on(180) children about the "Anemia and iron deficiency among Children: burden, severity and determinant factors in Southwest Ethiopia" which revealed that anemia was more than one half among children born to housewife mothers, and nearly one third among children born to employed mothers. This may be reflecting the fact that working mothers didn't have enough time to make healthy food and Good care for their children.

Current study result showed that, nearly two thirds of the studied student's family members were more than 5 to less than 7.and nearly three-quarter of them have 2-3children in the family. This result is in agreement with(**Selmi and AL-Hindi 2016).**

Who studied the "anemia among school aged 6-12 years old in Gaza Strip, Palestine" in which more than half of children were from big families and about one third had birth order above three. This may explain as big family makes the father or guardian generally unable to bring all requirements to each member of the family increased susceptibility for disease.

Regarding to nutritional pattern among primary school children the present study showed that more than three quarter of studied student did not have breakfast at home before their going to school. This result is in agreement with result of study carried by **Somemantri et al.,(2017**) who conducted study on (200) student about the "iron deficiency anemia and educational achievement among school children in Indonesia" which showed that the mostly of studied children didn't have breakfast before going to school. This may be attributed to children' unaccustomed way of taking their breakfast with family. In addition, parents' lack of awareness regarding children' nutritional requirement. Thus, nutrition education and counseling should provide to them.

The present study showed that, there was increased consumption of soft drinks,

more than half of studied children. The current study also showed that all most of the studied children their meal did not contain all of necessary nutrient. This finding is agreement with the study carried by **Than et al., (2018).** Who studied the "risk factors for low iron intake and poor iron status in British young people 4-13 years old" in 250 children, which showed that more than half of children have soft drink, and mostly of them have fast food. This could be because soft drinks contain polyphenois, which inhibit non-heme iron absorption. In contrast to current study **Vereecken, et al., (2018)** Who studied the dietary intake in children and found a higher intake of healthy items and a lower intake of less healthy items such as soft drink and coffee in children.

According to medical history the present study showed that, more than three-quarters of studied student's mothers age during pregnancy were ranged between 30>40 years old. This result is in line accordance with the study carried in Indonesia on (190) participant, which showed that mother age >35 years are more risk for children experiencing iron anemia **JuliWidiyantoet al.,(2019) "** Maternal age and Anemia are Risk factors of anemia with children". The result was also supported by the result of study carried **by Nasrullah et al., 2016) and Baker**

etal.,(2019) research providing that there is significance relationship between mother's age during pregnancy and the incidence of anemia for their children. This may be indicated that maternal pregnancy over 35 years tents to lead to health problems such as hypertension, diabetes mellitus, anemia, etc., which tend to be indicator of risk both to health and safety of mother and children. On other hand, this result in disagreement with the study carried by **Turyashemerewa et al .,(2018)** Who conducted study on (122) primary school children about the "Dietary pattern, anthropometric status, prevalence and risk factors for anemia among school children aged 5-11years in Uganda", which revealed that regarding to maternal characteristics, anemia in children showed statistically association with teenage mother in both the rural and urban areas.

Also, this study showed that about one third of studied children having previous hospitalization and nearly half of them were delay in their growth. This result disagreement with the study carried by **Josha et al., (2019)**. Who studied the "overview of the management and prognosis of sickle cell anemia, Walters Kluwer" which revealed that all children in study had hospitalization before, and the majority of them had hospitalization because a reason related to the

disease. And more than half of them were delayed in their growth.

In the current study, the prevalence of iron deficiency anemia among primary school children with a positive medical history for diarrhea more than half and parasitic infestation more than two-tenth was higher than that among children with a negative medical history for constipation. This result is in agreement with **Shubair et al., (2019)**. Who studied "intestinal parasites in relation to hemoglobin level and nutritional status of school children in Gaza", which revealed that diarrhea and parasitic infestation were reported in different study in Gaza Strip and have been shown to be associated with anemia among school- age children in Gaza. This may be because diarrhea affects absorption and may lead to loss of blood from gastro-intestinal tract.

The current study showed that, nearly three-quarter of studied student was delivered abnormal weight. This result is agreement with a cross-sectional study carried in Qatar by **zainel ALAL et al., (2018)**. Which revealed that children who was born with low birth weight were shown to be more prone to IDA compared with those was born with normal weight.

This finding is similar to a study conducted in Estonia by **Milleretal**., **(2019)** Who studied the "factors associated with iron depletation and iron deficiency anemia among Arabic school children in the United Arab Emirates" on 200 children, where the mean birth weight among the iron deficiency group was significantly lower than in the control group.

Present study revealed that, those children born through caesarean- section were two third higher risks for iron deficiency anemia than those born through normal delivery. This finding is consistent with results of study carried by **Zhou et al., (2018).** Who studied the "impact of cesarean section and iron related hematological indices in children in Kudat, Sabah, Malaysia" on 160 participants who indicated that compared with vaginal delivery, caesarean section is associated with reduced iron – related hematological indices in children. This in turn indicated that children delivered by caesarean section be more likely to develop IDA later compared with their normally delivered counterpart.

The current study result also showed that, less than half of studied student's parents had satisfactory total knowledge and around two- third of them had unsatisfactory total

knowledge about iron deficiency anemia and proper nutrition based on questionnaire filling score . It was concluded that there was correlation between the incidence of anemia and knowledge of parents. This is contrary to the research conducted by **Marin Tangkelangi (2019).** Who conducted study on (222) participants about the "correlation of malnutrition, worm infection, parents income and knowledge on anemia among 6-9 years old students of Libya Inpres Elementary school" which concluded that three quarter of parents have good knowledge about anemia based on their there is no correlation between incidence of anemia and knowledge of parents. The result obtained in this study is in line with the research carried by **Sohp**,**etal.,(2019)**. Who conduct study on 150 students about the "Relation factors family and child with anemia in child school in Makassar city" which concluded that there was correlation family knowledge about anemia and proper nutrition and incidence of IDA.

Regarding parents reported practices towards their children with iron deficiency anemia . The result of our study showed that more one half of them taken children to health units to take treatment, 21.7% of them go to nearest hospital, 18.3% of them go to the pharmacist. This result is agreement with the study carried by **ReindolfAnokye et al.,**

(2017). Who conducted study on (228) participants about the "perception of childhood anemia among mothers in Kumasi, Ghana" which reported that parents managed anemia in children mostly by taking them to hospitably, and almost one-half of them using domestic treatment.

Regarding relation between total parents knowledge and their characteristics the result showed that, there is no correlation between parents social status and there level of knowledge $p => 0.05$. This result in disagreement with study carried by **Al-Suwaid et al., (2017).** Who conducted study on 179 participants about the "knowledge and misconception about anemia among children in Al-Qatif area, eastern K.S.A" founded that there was significant relation between total knowledge score of mother's and there social status $p = < 0.004$. this may be explained by with higher education level of parent there were increased level of knowledge.

The results in this current study have administrated that there has been a marked significant difference between reported practices of studied student's parents about caring of their children with anemia and their level of education p- value$= <0.05$. and there is no significant correlation between parents' practices and their age and social status. This

finding was in line with cross-sectional study conducted in Korea on (717) students by **Hyeon- JeongChio et al., (2018).** Amid to" assess effects of maternal education level on anemia and iron deficiency in Korean school-age children" and showed that there was significant relation between reported mother's practices about caring of their anemic children and their level of education p=0.003, parent's level of education and place of living could affected or influence care of children with IDA and their health.

As regarding total level knowledge ,the current study finding revealed that there was highly significant difference between the studied student's parents total level knowledge and their reported practices regarding care for their children with anemia p-value $= <0.001$. Total knowledge satisfactory more than one-third and more than three-quarters was unsatisfactory .This results supported by **(Arrayed and Hajer, 2019)** who studied the "public awareness of IDA in Bahrain" they found that there was correlation between total knowledge score and practice score to prevent anemia. This may be due to knowledge play role for changing behavior leading to change of practices. This result disagreement with the study carried by **Reda Abd Elmohesn et al., (2017)** Who conducted study on (100) participant about "mother's knowledge and

practice regarding care of their children with anemia, in Menoufia" Showed that the majority of mothers had satisfactory practices regarding their children with anemia, while one- ten of them had unsatisfactory practices regarding their children.

The study on the parent's level of knowledge, attitude, and practice (KAP) towards IDA, Moreover, it is important to assess the level of KAP among parents and guardian especially among mothers as they are responsible in term of cooking and preparing foods thus affecting the iron stats intake in their daily nutrients. The result of p. value<0.05 is obtained in this study showing that there was significant weak positive correlation between the studied students' parents knowledge and their reported practice regarding their children with IDA . This result disagreement with the result of study carried by **Rosfazliana , (2019)** Who conducted study on (261) school children about "the prevalence and risk factors of iron deficiency anemia among rural school children in Malaysia" which showed that there is a marked significant level of KAP of children parent's with anemia p. value <o.oo1. In previous study comparing rural and urban communities on the level of KAP toward IDA, it has reflected that the knowledge level of urban

communities toward IDA was better than rural communities **Heshmat et al., (2019).**

5. Conclusion:

Based on the finding and research questions of the present study, it was concluded that:

There were two third of studied student's parents had unsatisfactory total knowledge regarding iron deficiency anemia and proper nutrition for their primary school children. more than three quarter of them did not have breakfast at home before going to school and takes pastimes between meals. More than half of them have regular drink soft drinks. there is a statistical significant difference between total knowledge of parent's about caring of their children with iron deficiency anemia and their level of education, job (P=<0.005), And there was highly statistically significant deference between the studied parent's total knowledge and their reported practice regarding care for their children with iron deficiency anemia P-value =<0.001).

6. Recommendation:

• The family should be counseled regarding the importance of increasing iron-rich food, including those with vitamin C that

improve iron absorption. And avoiding foods that impair iron absorption such as tea.

- Development of a guideline leaflet should be developed for mothers of children with IDA are essential to upgrading their knowledge about care of child with anemia.

- Parental control on children eating pattern and personal hygiene was recommended to decrease the anemia prevalence in children.

- Increase awareness about IDA and its symptoms among general population and educate them about easily available dietary source, their correct preparation for maximum utilization and recommended amounts to prevent the hidden consequences and silent suffering due to IDA.

- Further research: studies are needed on micronutrients deficiency, parasite infections, hereditary disorders and environmental pollutants.

Table(1): Distribution of the studied school children according to their socio demographic characteristics (n=115)

Items	No.	%
Age (years)		
6 > 8	23	20.0
8>10	47	40.9
10- 12	45	39.1
$\overline{X} \pm SD = 8.90 \pm 1.11$		
Academic level		
First grade	10	8.7
Second grade	13	11.3
Third grade	39	33.9
Fourth grade	17	14.8
Fifth grade and sixth grade	36	31.3
Child's ranking		
First	42	36.5
Second	25	21.7
Third	38	33.0
Fourth and more	10	8.8
Place of residence		
Rural	35	30.4
Urban	80	69.6
With whom the child lives:		
Father and mother	60	52.2
Father only	0	0
The mother only	55	47.8

Table (2): Distribution of the studied student's parents according to their socio-demographic characteristics (n=115)

Items	Mother		Father	
	No.	%	No.	%
Age in years				
>20	10	8.7	10	8.7
20>30	24	20.9	10	8.7
30 >40	50	43.5	58	50.4
< 40	31	26.9	37	32.2
Level of education				
Not read and write	0	0.0	0	0.0
read and write	0	0.0	0	0.0
Primary education	11	9.6	12	10.4
Elementary Education	13	11.3	21	18.3
Secondary education	44	38.3	36	31.3
University education	47	40.8	46	40.0
Job				
working	62	53.9	85	73.9
not working	53	46.1	30	26.1
Social Status				
Married	58	50.4	62	53.9
Divorced	34	29.6	35	30.4
Widow	23	20.0	18	15.7

Table (3): distribution of the studied students regarding their nutritional pattern (n=115)

Items	No.	%
Regular time of the basic meals (breakfast / lunch / dinner)	47	40.9
The child's meals contain all the necessary nutrients.	15	13.0
The child eats breakfast at home before going to school.	27	23.5
The child constantly eats fast food outside the home.	55	47.8
- The child regularly drinks soft drinks.	60	52.2
- The child drinks stimulant drinks such as tea, coffee or Nescafe.	38	33.0
The child takes pastimes between meals	85	73.9
The child takes rich fiber food (oats, eggs, rice,)	60	52.2
The child eats a meal of lunch contain various sources such as (protein - starches - vegetables - carbohydrates - vitamins – minerals such as iron)	30	26.1
Regular time of the dinner	55	47.8

Table (4): Distribution of the mothers according to their medical history during pregnancy and labor, and child history post labor (n=115)

Items	No.	%
The age of the mother during pregnancy/ years		
>20	22	19.1
20>30	28	24.3
30 >40	85	73.9
< 40	17	14.8
The pregnancy period followed medically	68	59.1
the mother have health problems during pregnancy	67	58.3
The problems complain during pregnancy	34	29.6
Taken medications during pregnancy:	67	58.3
Type of medication (67) Antibiotics Antihistamine Analgesic Hormones Other	18 16 7 1 25	26.9 23.9 10.4 1.5 37.3
Mother medical history during labor		
Expose to x ray during pregnancy	0	0.0
Baby's weight at birth (abnormal)	78	67.8
Type of labor: Normal Cesarean section	46 69	40 60
The child suffer injuries at birth	15	13.0
Items	**No.**	**%**
Child history post labor		
The child enters ICU neonates after birth	51	44.3
The child suffering from difficulty breathing at birth	26	22.6
difficult the child to breast-feed	65	56.5
Was the child breast feed?	53	46.1
continued the breastfeeding of the baby	41	35.6
The age of introducing complementary food to the child	63	54.8

Table (5): distribution of the studied students according to their measurement of Body Mass Index (n=115)

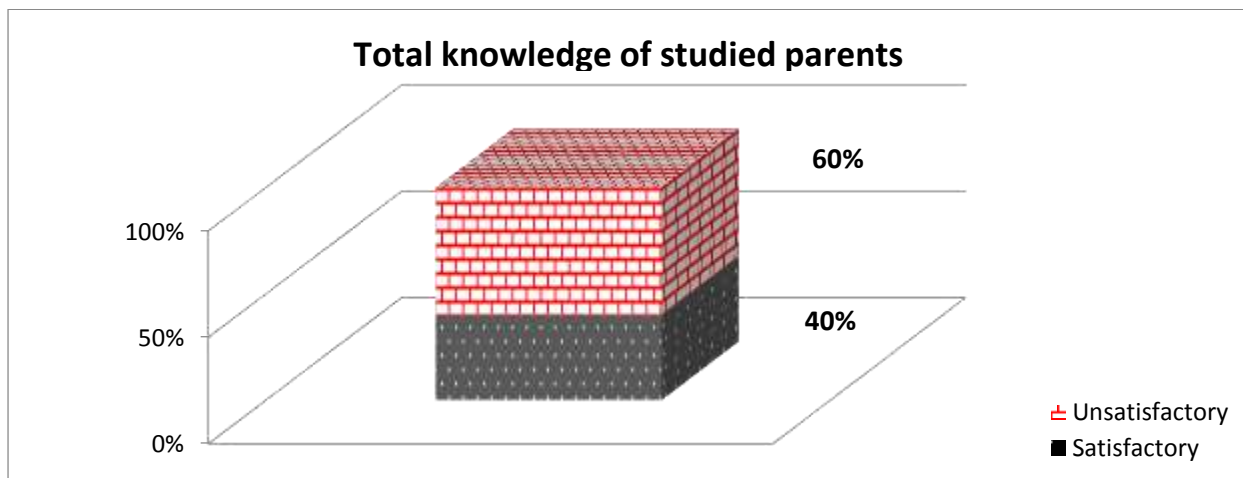| BMI	No.	%
Measurement of Body Mass Index		
<18.5 percentile (underweight)	53	46.1
18.5-<25 percentile (normal)	6	5.2
25-<30 percentile (overweight)	37	32.2
30-<35 percentile (obese)	19	16.5

Figure (1): Distribution of studied parents according to their total level of knowledge about iron deficiency anemia and proper nutrition for primary school children (115)
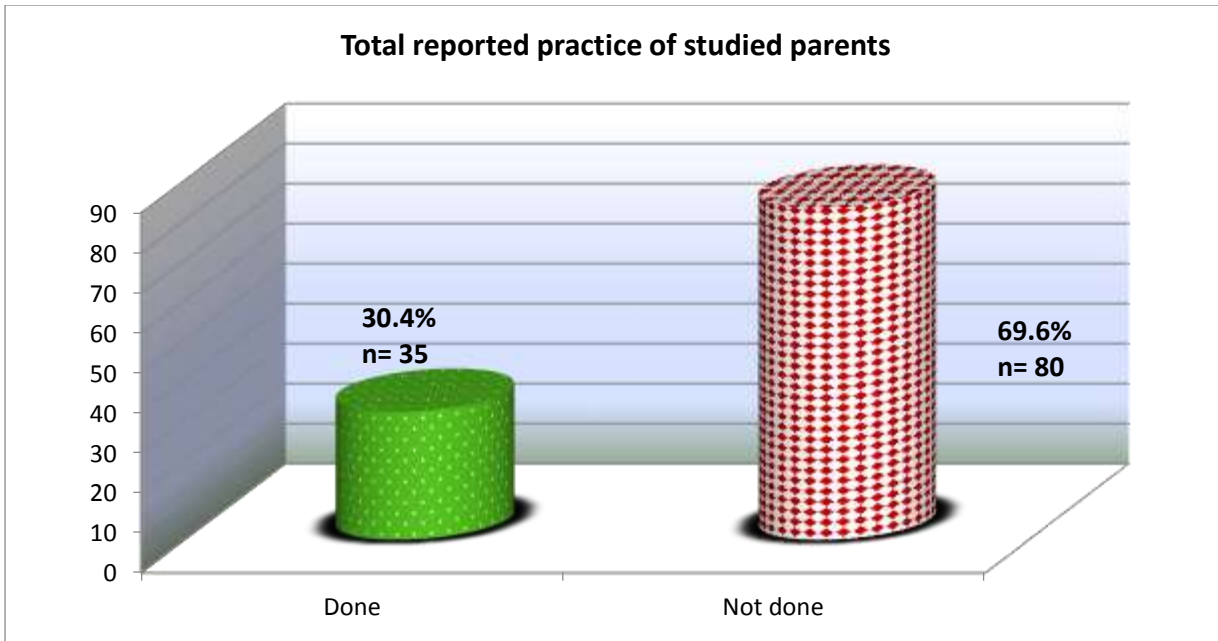
Figure (2): Distribution of studied parents according to their total reported practices regarding nutrition of their children with iron deficiency anemia (n=115)

Table (6): Relation between total studied parents' level of knowledge and their characteristics (n=115).

Parents' characteristics		Students' total knowledge				Chi-square test	
		Satisfactory (n=46)		Unsatisfactory (n=69)			
		No	%	No	%	X^2	P value
Age/ years > 20	Father	3	6.5	7	10.1	5.21	> 0.05
	mother	4	8.7	6	8.7		
20 > 30	Father	7	15.2	17	24.6		
	mother	2	4.3	8	11.6		
30 > 40	Father	24	52.2	26	37.7		
	mother	27	58.7	31	44.9		
<40	father	12	26.1	19	27.5		
	mother	13	28.3	24	34.8		
Level of education: -Primary education	Father	2	4.3	5	7.2	7.81	< 0.05*
	mother	1	2.2	3	4.3		
-Elementary Education	Father	3	6.5	6	8.7		
	mother	2	4.3	4	5.8		
-Secondary education	Father	14	30.3	33	47.8		
	mother	10	21.7	27	39.1		
-University education	Father	25	54.3	25	36.2		
	mother	33	71.7	35	50.7		
Job: - Working	Father	31	67.4	54	78.3	6.62	< 0.05*
	mother	26	56.5	27	39.1		
-Not working	Father	15	32.6	15	21.7		
	mother	20	43.5	42	60.9		
Social status -Married	Father	26	56.5	32	46.4	0.68	> 0.05
	mother	25	54.3	37	53.6		
-Divorced	Father	15	32.6	19	27.5		
	mother	14	30.4	21	30.4		
-Widow	Father	5	10.9	18	26.1		
	mother	7	15.2	11	15.9		

*Statistically significant differences.

Table (7): Relation between studied parents' characteristics and their total reported practices regarding care of iron deficiency anemia (n=115).

Parents' characteristics		Parents' total practices				Chi-square test	
		Done (n=35)		**Not done (n=80)**			
		No	%	No	%	X^2	P value
Age/ years > 20	father	2	5.7	8	10.0	9.47	> 0.05
	mother	3	8.6	7	8.8		
20 > 30	father	12	34.3	17	21.3		
	mother	2	5.7	8	10.0		
30 > 40	father	18	51.4	26	32.5		
	mother	23	65.7	35	43.7		
<40	father	3	8.6	19	23.8		
	mother	7	20.0	30	37.5		
Level of education: -Primary education	father	2	5.7	5	6.3	12.60	< 0.05*
	mother	2	5.7	2	2.5		
-Elementary Education	father	3	8.6	6	7.5		
	mother	3	8.6	3	3.7		
-Secondary education	father	12	34.3	37	46.3		
	mother	17	48.5	20	25.0		
-University education	father	18	51.4	32	40		
	mother	13	37.1	55	68.7		
Job: - Working	father	21	60.0	64	80.0	2.70	> 0.05
	mother	22	62.9	31	38.7		
-Not working	father	14	40.0	16	20.0		
	mother	13	37.1	49	61.3		
Social status -Married	father	16	45.7	42	52.5	1.60	>0.05
	mother	15	42.8	47	58.7		
-Divorced	father	12	34.3	22	27.5		
	mother	15	42.8	20	25.0		
-Widow	father	7	20.0	16	20.0		
	mother	5	14.3	13	16.3		

*Statistical significant differences.*P value is significant at level <0.05

Table (8): Relation between parents' total level of knowledge and total level of reported practice about children with iron deficiency anemia (n=115).

Level of reported practices	Total Level of knowledge						Chi-square test	
	Satisfactory		Unsatisfactory		Total			
	No.	%	No.	%	No.	%	x2	p-value
Done	28	60.8	7	10.1	35	30.4	17.291	<0.001**
Not done	18	39.2	62	89.9	80	69.6		
Total	46	100%	69	100%	115	100%		

**p-value <0.001 HS

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