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KNOWLEDGE ABOUT IRON DEFICIENCY ANEMIA AMONG PREGNANT MOTHERS IN THE FIRST TRIMESTER IN SRI LANKA

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Abstract: The Hemoglobin (Hb) concentration below 11g/dl during pregnancy leads to Iron Deficiency Anemia (IDA). As increased maternal iron needs and demands from the growing fetus and placenta, pregnant mothers are at risk of having IDA which causes many complications during pregnancy and infancy. The purpose of this study is to explore the knowledge about IDA of pregnant mothers in the first trimester. A self-administered questionnaire was distributed in this quantitative descriptive study among 180 pregnant mothers in the first trimester using convenience sampling method, at the antenatal clinics, District General Hospital, Matara. Ethical approval was obtained from the Ethics Review Committee of the National Hospital of Sri Lanka. Data was analyzed by descriptive statistics using SPSS 22 version. Significantly 80% of the respondents have identified low Hb level (<11g/dl) as IDA. Most frequently mentioned causative factors of IDA were inadequate food intake (90%), and imbalance diet (80%) while malaria (10%) and stress (1%) mentioned by only a few pregnant mothers. Sixty percent of pregnant mothers identified that milk and milk products as inhibitors in iron absorption. Two third of pregnant mothers have identified tiredness and pale color of the body as dominant signs of IDA. Most known side effects were low birth weight (32%), premature delivery (30.5%) and postpartum anemia (30%). The study showed that considerable knowledge of pregnant mothers with respect to meaning, causes, signs and, iron-rich food sources of IDA while showing comparatively poor knowledge of the effects of IDA in pregnancy. Therefore, it is recommended to have more awareness programs to further educate on the effects of IDA among pregnant mothers in the first trimester in Sri Lanka.

Keywords: First trimester, iron deficiency anemia, knowledge, pregnant mothers, Sri Lanka

Introduction

The Iron Deficiency Anemia (IDA) is the most common micronutrient deficiency in the world today. Anemia is a disease condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiological needs, which varies by age, sex, altitude, smoking, and pregnancy status (WHO, 2018) of human beings. Iron is a mineral found in the red blood cells and is used to carry oxygen from the lungs to the rest of the body, as well as helps the muscles to store and use oxygen (WHO, 2018). In pregnancy due to the physiological changes of the body, pregnant mothers are significantly more prone to have anemia. The first trimester in pregnancy refers to the first three months of the pregnancy. This is the time period of the pregnant mother which is more vulnerable to having IDA.

Both red cell mass and plasma volume expand progressively from the first trimester of normal pregnancy. The expansion of plasma volume is 30 – 40% while increasing red cell mass in 20 – 25% (American Society of Hematology, 2018). Because the expansion in plasma volume is greater than the increase in red blood cell mass, there is a fall in hemoglobin (Hb) concentration, hematocrit, and red blood cell count. Despite this hemodilution, there is usually no change in mean corpuscular volume (MCV) or mean corpuscular hemoglobin concentration (MCHC). This will lead to insufficient transportation of hemoglobin to the mother as well as the fetus.

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Anemia in pregnancy is defined by Centers for Disease Control and Prevention (CDC) and World Health Organization as Hb concentration of less than 110 g/L (less than 11 g/dL) in venous blood. Further, it is categorized as mild anemia (10.0-10.9g/dl), moderate anemia (7-9.9g/dl) and severe anemia (<7.9g/dl). Furthermore, moderate and severe forms of anemia can be prevented by treating mild anemia. There are multiple causes of anemia, but the most common cause is the iron deficiency in pregnancy in both the developed and developing world (McMahon, 2010). Physiological iron requirements are three times higher in pregnancy than they are in the menstruating women (Topiaro et al, 2001). Because of these physiological changes and other underlying causes such as nutritional deficiencies, illnesses, heavy work, stress, hook worm infections, malaria, and thalassemia, pregnant mothers are at high risk of having IDA (WHO, 2018). Complications of IDA seem to be the low birth weight of the baby, premature deliveries, maternal death, intrauterine death, and post-partum anemia (WHO, 2018).

The symptoms of IDA in pregnancy can be seen as fatigue, weakness, pale or yellowish skin, irregular heartbeats, shortness of breath, dizziness or lightheadedness, chest pain and cold hands and feet (WHO, 2018). As precautions, instructed to eat a varied diet of iron-rich foods and foods that enhance iron absorption (meats and ascorbic acid-rich fruits) (WHO, 2018). Foods which inhibit absorption of iron (tea, coffee, whole-grain cereals, unleavened whole-grain bread, and dried beans) should be consumed separately from iron-rich foods. Also, the use of iron supplementation during pregnancy is a preventive tool to overcome from IDA (Di Renzo, 2015).

It is estimated that 1.6 billion individuals worldwide have anemia and generally 50% of cases of anemia are due to iron deficiency and about twice as many individuals are estimated to be affected by iron deficiency (Berger et al. 2011). Worldwide, the prevalence of anemia during pregnancy has been estimated as 41.8%, corresponding to 56.4% of the total female population (WHO, 2006). More than two-thirds (75%) of them belongs to Asia (Wang & Cochran, 2002). Although more prevalent in less-resourced countries, women from developed countries (18%) are also affected (Wang, 2002). Regarding the Sri Lankan context, IDA in pregnancy was estimated at around 29% (WHO, 2008). Studies were done in the Western and North Central Provinces regarding IDA in pregnancy and they were reported IDA in pregnancy 18% and 14% respectively (Chathurani et al, 2012: Prathapan, 2011).

However, it is difficult to get a clear picture of the knowledge of IDA among pregnant women in the first trimester as very as few studies were conducted in Sri Lanka. Therefore, it is worthwhile to explore the knowledge of IDA of pregnant mothers in the first trimester. It may also be helpful in conducting more awareness programs to prevent the effects of IDA in second and third trimesters as well as in the post-natal period. Hence the current study aims to identify the knowledge about IDA among pregnant mothers in the first trimester at the antenatal clinics in District General Hospital, Matara, Sri Lanka.

Methodology

A quantitative descriptive study was conducted at the antenatal clinics in District General Hospital, Matara from January to April 2018. The self-administered questionnaires were distributed among 180 pregnant mothers in the first trimester by using convenience sampling method. The questionnaire focused on demographic characteristic and different domains of IDA such as, general knowledge, knowledge of side effect, causing factors, signs and symptoms, preventive measures, treatments and information sources. Ethical approval was obtained from the Ethics Review Committee of the National Hospital of Sri Lanka. The permission was obtained from the Director of the District General Hospital, Matara. Data was analyzed by descriptive statistics using SPSS 22 version.

Results

Out of 180 participants, more than half of the respondents (57.8 %) were in middle reproductive age (25yrs – 35yrs). Table 1 interprets that most of the study population (53.4 %) were built up around secondary education while a smaller number of them (4.4 %) were graduates. Significantly 160 (92.2 %) participants were married and only 20 were unmarried in the study sample. Majority of the respondents (82.2 %) were none vegetarian and 32 of them (17.8 %) were vegetarian. Nearly half of the respondents had (44.4 %) two years to five years gaps between two pregnancies. As shown in the following figure, 156(86.7%) were Buddhists while Hinduism 12(6.7%), Islamic 8(4.4%) and Christian 4(2.2%) respectively

Table 1: Demographic characteristic of the study sample. (N=180)

Demographic characteristic	Percentage (%)	Demographic characteristic	Percentage (%)
Age (Years=Yrs)		Education	
>20	14.4	No formal education	6.7
21 - 24	9	Primary	2.2
25 - 35	57.8	O/L	53.4
36 - 40	16.6	A/L	33.3
41 >	2.2	Degree	4.4
Birth Spacing		Religion	
< 2 Yrs	22.3	Buddhism	86.7
2 – 5 Yrs	44.4	Hinduism	6.7
> 5 Yrs	33.3	Islamic	4.4
Dietary Pattern		Marital Status	
Vegetarian	17.8	Married	92.2
Non-Vegetarian	82.2	Unmarried	7.8

As interpreted in Figure 1, significantly more than 60% of the respondents have heard of IDA after they got pregnant while around 30% of the respondents have heard about IDA beforehand getting pregnant. Further, 117 (65 %), 108 (60 %), 144 (80 %) and 54 (30 %) of the respondents were able to link IDA with low Hb level, poor nutrition, reduce volume in the blood, white color or pale look of the body respectively. Out of 180 respondents, 36 (20%) study participants were not aware of the meaning of the IDA (Figure 2).

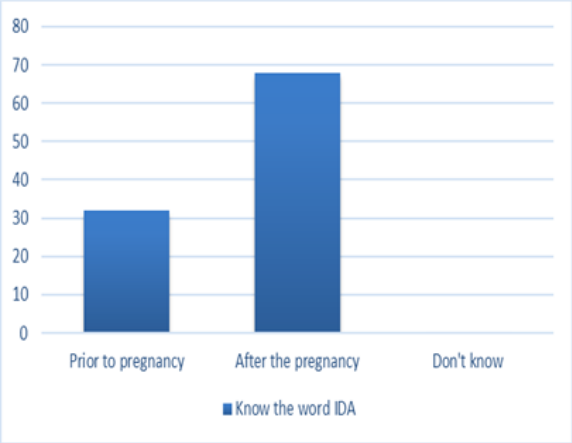

Figure 1: Know the word: IDA

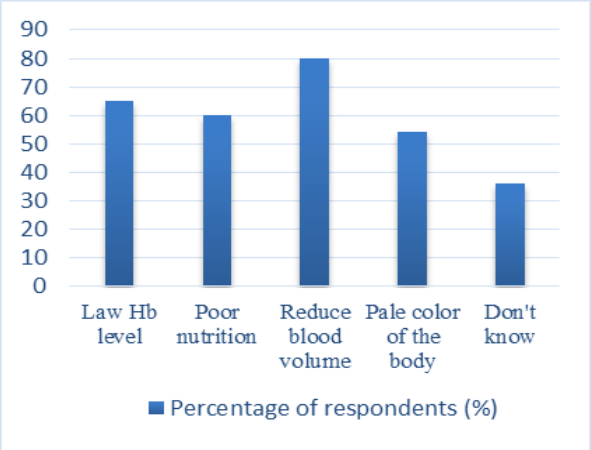

Figure 2: Knowledge of the meaning of IDA

As summarized in the Figure 3 more than half of the respondents identified eggs (92%), chicken liver (75%), red meat (72%), green vegetables (68%), grains (61%), fruits (60%), fish (60%) and chicken (54%) as iron rich-food sources. The least known iron-rich food source is enriched cereals.

As interpreted in Figure 4, knowledge regarding the effect of coffee (88%) and tea (92%) in the absorption of iron was at a significant level. Also, the percentages of awareness regarding the effect of milk and milk products, caffeine and fruit or fruit juice of the study subjects were around 50%. Only 36 women (20%) don't know about the foods that cross off the iron absorption.

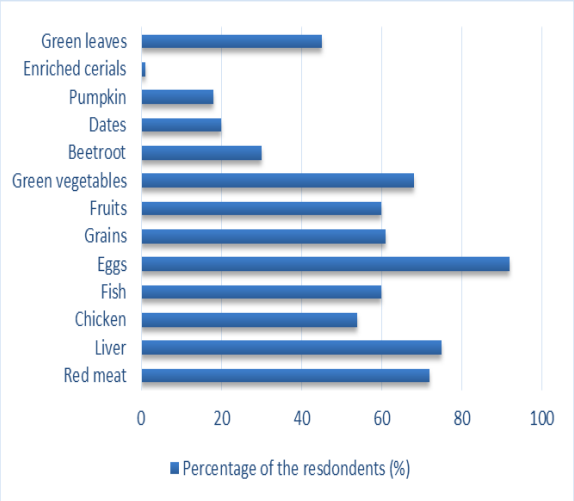

Figure 3: Knowledge of iron-rich food Sources

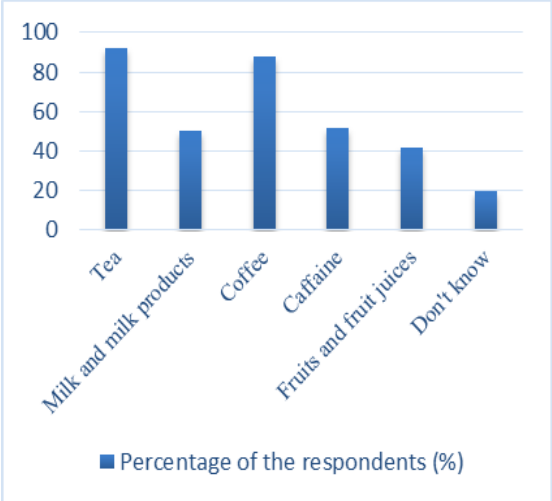

Figure 4: Knowledge of the foods which inhibit iron absorption

As interpreted in Figure 5, none of the subjects in the survey study group identified all the causative factors of IDA. Among 10 causative factors, the most known factor was inadequate food intake (90%) following least known risk factor, thalassemia (5%). Also, participants were identified not getting a balanced diet (80%) and heredity (50%) as responsible factors for having IDA in pregnancy while none of the participants aware about stress as a causative factor of IDA.

When considering signs and symptoms associated with IDA, this study subjects reviewed that more than two-thirds of the respondents found tiredness and fainting (90%), a headache (90%), pale color of the body (85%)

and pale color of the nail, tongue and mucous membrane of mouth (80%) as most known signs and symptoms associated with IDA as shown in Figure 5. The knowledge regarding other factors such as trembling, shortness of breath and bleeding of the gum is comparatively low.

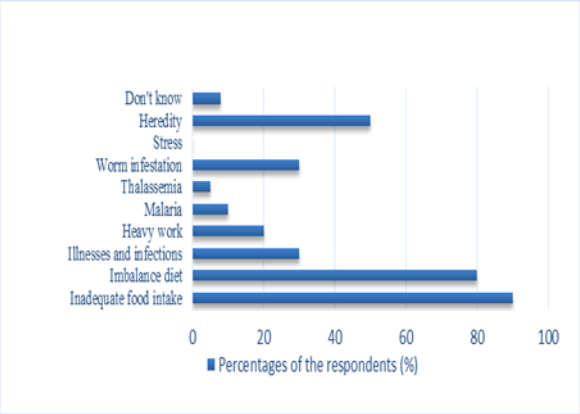

Figure 5: Knowledge of causative factors of IDA

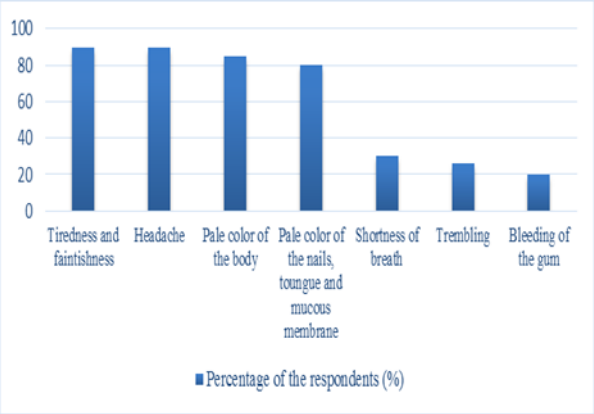

Figure 6: Knowledge about signs and symptoms of IDA

As Figure 7 shows when concluding results, out of six side effects 32% of respondents were aware of low birth weight as a side effect of IDA. Study subjects were identified as premature delivery and post-partum anemia in equal percentages (30%). Also, nearly half of the respondents were mentioned intrauterine death and abortion as side effects while considerably 40% of pregnant women are not aware of the impact of IDA.

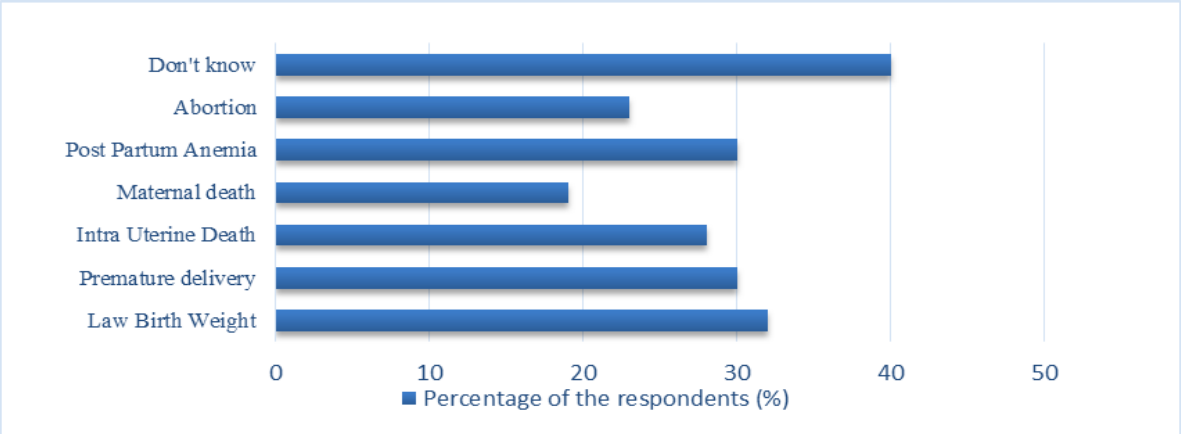

Figure 7: Knowledge of the side effects of IDA

When paying attention to the preventive measures of IDA, the most known preventive measures is the use of iron supplements daily (96%) following get well-balanced diet during pregnancy period (90%) and withhold having tea, coffee, milk with iron-rich foods and iron tablets (70%). Less than half of the study sample identified that taking fruit juice after main meals and taking iron tablet with orange juice (42%), treating worm infection (31%) and reducing heavy work (22%) as preventive measures while only 5% of respondents aware about keeping more than 2 years birth spaces as a preventive measure of IDA (Table 2).

Table 2: Knowledge of preventive methods of IDA

Preventive methods of IDA	Number of respondents	Percentage of the respondents (%)
Get well balance diet during pregnancy	162	90
Reducing heavy work	40	22
Treating worm infection	56	31
Use of iron supplements daily approval	173	96
Don't take tea, coffee, milk with iron rich foods and iron tablets	126	70
Taking fruit juice after main meals and taking iron tablet with orange juice	75	42
Keep more than 2 years birth space	9	5

Discussion

Out of 180 participants, more than half of the respondents (57.8 %) were in middle reproductive age (25yrs – 35yrs). This finding is compatible with two studies done in Sri Lanka as they found the mean age is 27yrs and 29yrs (Chaturani et al, 2012; Wijesinghe et al, 2015). A study conducted in India related to IDA of pregnant mothers found that the mean age of the study population was 29.9 ± 5.1(Kulkarni, 2015). This is in contrast with a study done in Karnataka, India as a majority of the women (60.50%) were in the age group 20-24 years (Yadev et al, 2014). In the current study, most of the study population (53.4 %) were built up around secondary education while a smaller number of them (4.4%) were graduates. This finding is compatible with the study done by Yadev et al (2014) as out of 400 respondents, 37.0% studied up to secondary level and 8.3% studied up to graduate level respectively.

Significantly, more than 60% of the respondents have heard about IDA after they got pregnant while around 30% of the respondents have heard about IDA beforehand getting pregnant. Under the meaning of IDA more than half of the participants have identified it as a decrease of Hb level in the blood and reduced blood volume in the body. Averagely, participants have good knowledge about the general definition of IDA. This result is also parallel to the study done in India (Raksha, 2016).

In the present study, most of the first trimester pregnant mothers have identified the main food sources containing iron. This result is supported by a study done in Palestine (Kdivar et al, 2007). According to this study the awareness regarding the effect of tea, coffee and milk on iron absorption was at a high level. This result is compatible with the Kdivar et al (2007) findings. Further, a study conducted in India, out of 250 women, 122 were aware of the correct sources of iron in food (Kulkarni, 2015). The knowledge regarding the role of fruit juice in iron absorption is comparatively poor as the findings of the current study. Kulkarni (2015)

further emphasized that, out of 250 women, 128 females had no idea as to which foods help them to prevent anemia.

Respondents have identified inadequate food intake, and not getting a balanced diet as main causative factors for IDA. This result is supported by a study done in Palestine (Kdivar et al, 2007). They have identified poor nutrition, inadequate food intake, bleeding and use of contraceptives as main causative factors for IDA. In the current study the most frequently mentioned causative factors of IDA was related to nutrition while only a few identified worm infection and malaria as causative factors. Based on that finding the study is concluded that the study participants had knowledge regarding the causes of IDA is only clattered around one direction. In contrast to this study, a study done in Uganda was concluded that participants had considerably minimum knowledge about causing factors and the underlying reason is mentioned as the low education level of the respondents (Mbule et al, 2012).

Most of the respondents have identified tiredness and faintishness, pale color of the body, pale color of the nail, tongue and mucous membrane and the headache are the main sign and symptoms in the IDA. However, only a few respondents were identified the sign of shortness of breath. Except for the previously mentioned sign, in the current study the awareness regarding signs and symptoms at an average level. In contrast to our study findings, Raksha, (2016) and Mishra, (2016) have identified knowledge regarding signs and symptoms of IDA was at a poor level.

In general, the study participants had poor knowledge regarding the impact of IDA in pregnancy. These findings were similar to a study which was done in Palestine (Kdivar et al, 2007), which highlighted that more than half of the first-trimester pregnant women didn't know about the impact of IDA in pregnancy. The current study results are compatible with a research study done in India as less than one-fifth of participants were aware of a few maternal complications like growth retardation and prematurity of anemia in pregnancy (Kulkarni, 2015).

Furthermore, more than two-thirds of the first trimester pregnant mothers had satisfied knowledge about prevention methods of IDA. This result supported by two studies separately done in India and Palestine (Raksha, 2016; Kdivar et al, 2007). Those studies have concluded that the majority of the respondents have knowledge regarding prevention methods of IDA while knowledge on the role of ascorbic acid in iron absorption was at a low level (<50%). But knowledge of the importance of the role of fruit juice in iron absorption was at a low level in the current study. And also, very few antenatal women identified deworming before or during pregnancy and keeping space between two pregnancies as preventive methods. This result is much compatible with the findings of the study done by Kulkarni (2015), the role of deworming was known to only 16 women out of 250 participants and neither of the women aware of the minimum spacing period between two pregnancies.

Conclusion and Recommendations

Majority of the study subjects gather knowledge about IDA after the pregnancy. The study showed that considerable knowledge with respect to meaning, signs and symptoms, iron-rich food sources, foods which inhibit the absorption of iron, preventive methods and the treatments of IDA. Significantly 80% of the respondents have identified low Hb level (<11g/dl) as IDA. Most frequently mentioned causative factors of IDA were inadequate food intake (90%), and imbalance diet (80%) while malaria (10%) and stress (1%) mentioned by only a few pregnant mothers. Sixty percent of pregnant mothers identified that milk and milk products as inhibitors in iron absorption. Two-third of pregnant mothers have identified tiredness and pale color of the body as dominant signs of IDA. Most known side effects were low birth weight (32%), premature delivery (30.5%) and postpartum anemia (30%). The study also, showing comparatively poor knowledge of the causes of IDA and the impact of IDA in pregnancy.

Since IDA can be treatable and controllable, regular screening programs are required to identify the vulnerable pregnant mothers in the early stage. Therefore, the findings of the study suggest that to further strengthen the current awareness programs and clinics conducted by the MOH office and more elaborate on the role of PHNS when delivering care. It is recommended to focus more on having awareness programs regarding the causes and the impact of IDA in pregnancy and the identified lacking points of other factors related to IDA in pregnancy as it is affected to both the mother and the baby.

There was a very limited amount of literature found regarding this topic in the Sri Lankan context. Further, the study was conducted only at District General Hospital, Matara. Even though the sample was 180, the researchers had a short period of time duration to collect data. When paying attention to all these consequences these study findings are not well enough to generalize to all parts of the country.

Acknowledgement

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