

*Research Article***Knowledge, attitude and practice regarding nutrition among pregnant women, Minia City, Egypt****Khaled Hussein M. El-Dessouki\***, **Nashaat N. Kamal\***, **Sara A. Refaie\*** and **Maryham R. Hanna\*\***

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**Abstract**

**Background:** Pregnancy is a time of increased energy and nutrient needs for a woman in order to meet the needs of the growing fetus and of maternal tissues associated with pregnancy. Proper dietary balance is necessary to ensure sufficient energy intake for adequate growth of fetus without drawing on mother's own tissues to maintain her pregnancy. **The aim of the study:** to assess the knowledge, attitudes, and practice of pregnant mothers regarding maternal nutrition in the antenatal care clinic at Western Health Center in Minia City, during the period from November 2016 to March 2017. **Participants and Methods:** A cross-sectional descriptive study was done on pregnant women attending Antenatal care clinic in Minia City during a period from November 2016 to March 2017. The quantitative data were analyzed using SPSS for windows version (24). Multiple logistic regression was run to assess factors that were associated with the dependent variable at  $p < 0.05$  and to control the confounders. **Results:** This research showed that (82.9%) of participants had adequate knowledge, (58.9%) had a positive attitude and (58.7%) had good practice about nutrition during pregnancy. It was found that: there was a significant moderate positive correlation between knowledge score and attitude score, also there was a significant positive correlation between knowledge score and practice score. There was a positive significant relationship between age, educational status of mothers, monthly average income, antenatal care visits, gestational age, gravidity, birth spacing, mode of previous delivery, and associated diseases had a statistically significant association with the knowledge. Also, there was a positive significant relationship between age, educational status of mothers, occupation, monthly average income; antenatal care visits, gestational age, pregnancy spacing, and associated diseases had a statistical association with the attitude of mothers on nutrition during pregnancy. **Conclusion:** There was a positive significant relationship between age, educational status of mothers, occupation, monthly average income; antenatal care visits, gestational age, birth spacing, and associated diseases had a statistical association with the practice of mothers on nutrition during pregnancy.

**Keywords:** knowledge, attitude, practice, maternal nutrition, pregnancy, Minia**Introduction**

Pregnancy is a critical period during which good maternal nutrition is a key factor influencing the health of both the child and mother.<sup>1</sup>

Pregnancy is a time of increased energy and nutrient needs for a woman in order to meet the needs of the growing fetus and of maternal tissues associated with pregnancy. Proper dietary balance is necessary to ensure sufficient energy intake for adequate growth of fetus without drawing on

mother's own tissues to maintain her pregnancy.<sup>2</sup>

**Nutritional Needs During Pregnancy**

To ensure that nutritional needs are met, pregnant women are encouraged to consume a diet rich in vegetables, and folic acid.<sup>3</sup>

**Energy requirement**

Total daily caloric intake should include 55% CHO, 15% proteins, 30% fat with keeping in mind the individual needs of pregnant women.<sup>4</sup>

The total caloric requirement is 2200 kcal to 2800 kcal/day for most women; more calories may be needed for active women and nutritionally deficient women. Energy needs during pregnancy can be met by increasing consumption of complex carbohydrates, monounsaturated, polyunsaturated fats, and protein in the diet.<sup>5</sup>

#### **A) Macronutrients:**

**Carbohydrate:** Carbohydrate intake of at least 175 mg/day is considered to be important for the adequate supply of glucose for the fetus during pregnancy.<sup>6</sup>

**Food source of carbohydrate** Whole grain bread, cereals, fruits, and vegetables should be consumed to meet the maternal and fetal glucose needs and to provide fibers for bowel regulation.<sup>7</sup>

**Fat:** The recommendations for the amount of fat as a percentage of total calories do not change during pregnancy, so like all adults; pregnant women should consume no more than 30% of calories as fat. It should be considered that the type and quality of fat eaten during pregnancy are especially important. Mothers should be encouraged to increase their consumption of the foods containing omega 3 fatty acids because it is necessary for the development of the brain and nerve tissue in the fetus.<sup>8</sup>

The essential fatty acids, omega-6 (linoleic acid) and omega-3 (alpha-linolenic acid), cannot be synthesized in the human body and therefore must be obtained exclusively from food sources. Their health benefits are: increase gestational length, increase cognition and visual performance, and decrease the incidence of preterm birth, preeclampsia, and depression. DHA, in particular, is found in large amounts in the brain and in the retina.<sup>9</sup>

**Food source of essential fatty acids:** The best source of the two essential fatty acids is vegetable oils. Rich sources of linoleic acid are corn oil, sunflower oil, soybean oil. Alpha-linolenic acid is found in flax seed, soybean oil and canola oil.<sup>10</sup>

**Protein:** Protein is essential in the development of a healthy baby as it forms the structural basis for all new cells and tissues in the mother and fetus. It is important to ensure the adequate balance of

protein to energy as high protein alone can cause harm to the fetus. A balanced intake of energy and protein seems to improve fetal growth.<sup>11</sup>

Proteins are necessary to build and repair tissue, for the synthesis of hormones, enzymes, and antibodies, and for many other bodily functions. Adequate energy intake is required along with adequate dietary protein intake to allow protein and amino acids to be used for these functions. Protein requirements increase in pregnancy to support maternal tissue synthesis and fetal growth, principally in the third trimester.<sup>12</sup>

**Food source of protein:** Complete protein contains all the essential amino acids to meet body needs are eggs, milk, cheese, and meat. Incomplete proteins that are deficient in one or more of essential amino acids they are of plant origin, such as legumes, grains, nuts, seeds. Most foods contain a mixture of proteins (animal and plant foods) complement one another so the key to a balanced diet is variety.<sup>5</sup>

#### **B) Micronutrients:**

**Vitamins** are important to support a healthy pregnancy. Both vitamin A and C are needed in higher amounts because they are important in the growth of the tissues. Also, there is an increased need for B vitamins because they play an important role as coenzyme factors for energy production and protein metabolism. The B vitamins act as coenzyme factors in metabolic activities that important for energy production, tissue protein synthesis and functions of muscles and nerve tissues, so they participate in the production of energy throughout the body, which is important during pregnancy. Well-balanced diet in both quality and quantity supply the body with its needs of nutrients.<sup>4</sup>

**1- Vitamin A:** supplementation is only recommended for pregnant women in areas where vitamin A deficiency is a severe public health problem to prevent night blindness.<sup>3</sup>

**2- Vitamin D:** is considered to be important during pregnancy to ensure absorption of calcium and phosphorus for the growth of the fetal bones.<sup>13</sup> Vitamin D deficiency is considered to be a common worldwide problem, including pregnant

women.<sup>14</sup> that associated with many bad outcomes for both mothers and their fetuses as preeclampsia, gestational diabetes mellitus, and impaired fetal growth.<sup>15</sup>

**3- Vitamin E:** Although vitamin E deficiency is rarely seen in healthy adults, for pregnant women, insufficient dietary vitamin E may lead to complications such as preeclampsia and the baby being born small<sup>16</sup>.

**4- Vitamin K:** As well as being needed for healthy bone development and protein formation in the liver, vitamin K plays a key role in blood clotting, enabling wounds to heal properly. This is particularly important during labor and just after you've given birth when your body is recovering and starting to heal. Sufficient levels of vitamin K are also crucial for your baby immediately after birth and, while vitamin K deficiency in babies is very rare, it can lead to a condition that increases their risk of bleeding too much.<sup>17</sup>

**5- B vitamins:** B vitamins including thiamine, riboflavin, niacin, pyridoxine, vit. B12, pantothenic acid, and folate have an important role during pregnancy.<sup>18</sup>

**6- Vitamin C:** A significant benefit of vitamin C for pregnant women is its influence on non-haem iron absorption. An adequate intake of iron is essential to support your increased blood volume and reduce the risk of iron-deficiency anemia, a condition that can affect your own health and your baby's development.<sup>19</sup>

### **C) Minerals:**

**1. Iron** is an essential nutrient for the human body. It is required for the transport of oxygen in the blood, as well as for the proper functioning of many processes in the body necessary for good health. It is well known that iron requirements increase during pregnancy to support the expanding blood volume, the growth of the fetus, placenta and other tissues associated with pregnancy. The recommendation for iron during pregnancy is 27 mg/day, almost double the requirement when not pregnant.<sup>20</sup>

**2. Calcium** is important for the normal development and maintenance of the skeleton. It is important for strong bones and teeth. Calcium status is affected by vitamin D. Moderate physical activity is associated with increased bone mineral

density. The recommendation for calcium during pregnancy is 1000 mg/day and Vitamin D is 600 IU (15 µg) /day.<sup>20, 21</sup>

**3. Zinc** is considered to be important during the first trimester of pregnancy at the time of organs are formed and it may play a role in immune system development for the fetus Zinc deficiency during pregnancy is associated with an increased risk of congenital anomalies (including neural tube defects), low birth weight and premature delivery.<sup>22</sup>

**4. Iodine** is a necessary element for the production of thyroid hormone. Iodine requirements increase approximately 50% during pregnancy to meet the higher demands caused by the increased production of thyroid hormones, the fetal need of iodine supply from the mother and increased renal excretion of iodine due to the physiology of pregnancy. If iodine deficiency occur during pregnancy the following disorder may result; spontaneous abortion, stillbirths, cretinism, congenital anomalies, psychomotor effects, and mental retardation.<sup>23</sup>

**5. Selenium** requirements increase in pregnancy to allow for growth of the fetus. Selenium has important functions in the body as antioxidant functions and thyroid hormone metabolism and may be protective against some cancers and cardiovascular disease by protecting against free radical damage.<sup>24</sup>

### **Methods**

**Study Designs** A descriptive cross-sectional study was conducted to assess the knowledge, attitudes, and practices of pregnant women about maternal nutrition with quantitative data collection method from November 2016 to March 2017.

**Study population:** All pregnant women who visited the healthcare facility for antenatal care follow up during November 2016 to March 2017.

**Inclusion criteria:** Pregnant women attending antenatal care clinic.

- Age: child-bearing period.

**Exclusion criteria:** Women who are non-pregnant.

- Women who are seriously ill.

- Women who refuse cooperation.

### **Administrative Consideration:**

**Knowledge, attitude and practice regarding nutrition among pregnant women**

. Official permissions were obtained from the Department of Public health and Preventive Medicine and the scientific ethical committee of the faculty of medicine Minia University.

. An approval was taken from the manager of Western Health Center in Minia City.

**Ethical Considerations:** The study group was informed about the nature and the purpose of the study and verbal consent was taken before the interview. Ensuring confidentiality.

**Data collection:** An interviewing questionnaire used in the study that includes: Socio-demographic characteristics, obstetric history, and history of associated diseases, knowledge, attitude, and practice of the women towards their nutrition during pregnancy.

**Data analysis:** The data were checked, cleared and entered into SPSS data sheet software and analysis was done by using SPSS version (24). The descriptive analysis such as proportions, percentages, frequency distribution and measures of central tendency were used.

Initially, the bi-variable analysis was performed between knowledge, attitudes, and practices of mothers on nutrition during pregnancy and each of the potential factors associated with knowledge of mothers on nutrition during pregnancy (independent variables), one at a time. Their odds ratios (OR) at 95% confidence intervals (CI) and p-values were obtained. The findings at this stage helped us to identify important associations.

Then multivariable analysis was performed using the logistic regression model.

## Results

The study was conducted on 380 pregnant women attending the antenatal care clinic at Western Health Center in Minia City, during the period from November 2016-March 2017 to assess knowledge, attitude, and practices among pregnant women about maternal nutrition during pregnancy.

### Socio-demographic characteristics:

(75%) lied in the age group between (20-35) years. (63.9%) had the level of secondary school. (89.7%) were house-wives,

(67.4%) earned greater than 2000 Pounds/month.

**Present reproductive and obstetric history:** (36.1%) had 4 antenatal visits, (51.6%) third trimester, (67.9%) were multi-gravida, (64.3%) had C/S.; more than half (52.7%) of the multigravida women had birth spacing between 2-3 years. Among those who suffered health problems (21.3%); anemia was the main problem (16.3%)

### Knowledge of mothers on maternal nutrition during pregnancy:

Showed that: (74.2%), (86.8%), (72.6%), (95.3%), (45%), (94.7%) and (79.5%) of the respondents had a complete correct answers to what is balanced diet, pregnant mothers differ than others, components of a balanced diet, proper nutrition is important from the first till third trimester, dangers of malnutrition for pregnant mother and the baby, and the benefit of birth spacing for pregnant woman respectively. Regarding knowledge about the sources of nutrients (74.2%), (86.6%), (77.4%) and (86.6%) had complete correct answers to the sources of iron, calcium, vitamins, and proteins respectively. About the importance of some nutrients (84.2%), (83.9%) and (86.1%) had knowledge about the importance of iron, milk and its products; and proteins respectively. (Tables 1, 2)

### The attitude of mothers on maternal nutrition during pregnancy:

The study showed that: (74.2%) agree with eating more food, (86.6%) agree with eating more carbohydrate during pregnancy than the non-pregnancy state. The majority of women, (75.3%), (95%), (88.9%) and (90%) had a positive attitude towards prepare omega 3 rich foods, eating more proteins, prepare iron-rich meals and eating more milk products respectively. Also, the majority of women (90%) and (75.5%) had a positive attitude towards preparing meals with iodized salt and eating more fresh fruits and vegetables, respectively. (Table3)

### The practice of mothers on maternal nutrition during pregnancy:

Table (6) Showed that: Only (18.7%) of women follow a specific dietary regimen, (90%) of women had the habit of eating

fresh vegetables and fruits. (96.6%) had diet frequency of 4 and above/day, (85.3%) of respondents had the habits of taking snacks, (80%) had the habit of eating more carbohydrates between meals than non-pregnant state, and (70.3%) follow up body weight during pregnancy. (95%) had the habit of drinking coffee/tea. Concerning micronutrient supply, (91.1%) of women had iron tablets and took them correctly. But (90%) of women had folic acid supplies, of them (95%) took before pregnancy or within the first trimester. About (96.8%) of women had calcium supplement, About protein intake, most women (98.7%) had the habit of taking protein of animal source of them only (24.5%) eat daily or more than 3 times/week; (98.2%) had the habit of taking proteins of plant

source of them (97.1%) eat daily or more than 3 times/week.

#### **About the Overall knowledge, attitude and practice scores:**

**Table (6)** Showed that (82.9%) of participants had adequate knowledge, (58.9%) had a positive attitude, while (58.7%) had good practice about nutrition during pregnancy

**Correlation between knowledge, attitude and practice scores:** showed that: there was a significant moderate positive correlation between knowledge score and attitude score ( $r=0.544$ ,  $p<0.001$ ), also there was a significant positive correlation between knowledge score and practice score ( $r=0.693$ ,  $p<0.001$ )

**Table (1): Knowledge about nutrition among the studied pregnant women, Minia City, during the period from November 2016- March 2017. (N =380)**

		Frequencies	
		n	%
<b>1-Good Balanced diet</b>	Do not know	53	13.9
	Incomplete Knowledge	45	11.8
	I know	282	74.2
<b>2-Pregnant diet differs than non-pregnant.</b>	Do not know	14	3.7
	Incomplete Knowledge	36	9.5
	I know	330	86.8
<b>3-Components of a balanced diet</b>	Do not know	55	14.5
	Incomplete Knowledge	49	12.9
	I know	276	72.6
<b>4-Proper nutrition is important from first till the third trimester</b>	Do not know	12	3.2
	Incomplete Knowledge	6	1.6
	I know	362	95.3
<b>5-Dangers of malnutrition on pregnant</b>	Do not know	91	23.9
	Incomplete Knowledge	118	31.1
	I know	171	45
<b>6-Danger of malnutrition on baby</b>	Do not know	7	1.8
	Incomplete Knowledge	13	3.4
	I know	360	94.7
<b>7-Importance of sufficient intervals between pregnancies</b>	Do not know	18	4.7
	Incomplete Knowledge	60	15.8
	I know	302	79.5
<b>Total</b>		380	100

**Table (2): Knowledge about sources and importance of some nutrients among the studied pregnant women, Minia City, during the period from November 2016- March 2017. (N =380)**

		Frequencies	
Knowledge		n	%
<b>8-Sources of iron</b>	Do not know	27	7.2
	Incomplete Knowledge	71	18.6
	I know	282	74.2
<b>9-Sources of calcium</b>	Do not know	38	10
	Incomplete Knowledge	13	3.4
	I know	329	86.6
<b>10-Sources of vitamins</b>	Do not know	37	9.7
	Incomplete Knowledge	49	12.9
	I know	294	77.4
<b>11-Sources of proteins (animal, plant)</b>	Do not know	15	3.9
	Incomplete Knowledge	36	9.5
	I know	329	86.6
<b>12-Importance of iron</b>	Do not know	36	9.5
	Incomplete Knowledge	24	6.3
	I know	320	84.2
<b>13-Importance of milk and its products</b>	Do not know	41	10.8
	Incomplete Knowledge	20	5.3
	I know	319	83.9
<b>14-Importance of proteins</b>	Do not know	17	4.5
	Incomplete Knowledge	36	9.5
	I know	327	86.1
<b>Total</b>		380	100

**Table (3): Attitudes about nutrition among the studied pregnant women, Minia City, during the period from November 2016- March 2017. (N =380)**

		Frequencies	
Attitude		n	%
<b>1-Concept of eating for two (eat more food)</b>	Don't agree	58	15.3
	Agree	322	84.7
<b>2-Must have more carbohydrates than non-pregnant</b>	Don't agree	75	19.7
	Agree	305	80.3
<b>3-Must have more proteins</b>	Don't agree	19	5
	Agree	361	95
<b>4-Must have more milk products</b>	Don't agree	38	10
	Agree	342	90
<b>5-Prepare iron-rich meals</b>	Don't agree	42	11.1
	Agree	338	88.9
<b>6-Prepare omega-3 rich foods</b>	Don't agree	94	24.7
	Agree	286	75.3
<b>7-Prepare meals with iodized salts</b>	Don't agree	38	10
	Agree	342	90
<b>8-Eat more fresh fruits and vegetables</b>	Don't agree	93	24.5
	Agree	287	75.5
<b>Total</b>		380	100

**Table (4): Practices about nutrition among the studied pregnant women, Minia City, during the period from November 2016- March 2017. (N =380)**

		Frequencies	
		n	%
<b>1-Follow specific dietary regimen</b>	Poor practice	309	81.3
	Good practice	71	18.7
<b>2-Eat three meals or more daily</b>	Poor practice	13	3.4
	Good practice	367	96.6
<b>3-Habit of eating snacks between meals</b>	Poor practice	56	14.7
	Good practice	324	85.3
<b>4-Habit of eating more carbohydrates between meals</b>	Poor practice	76	20
	Good practice	304	80
<b>5-Follow up weight during pregnancy</b>	Poor practice	113	29.7
	Good practice	267	70.3
<b>6-Eating fresh vegetables and fruits</b>	Poor practice	38	10
	Good practice	342	90
<b>If yes</b>	Twice or trice/week	17	4.9
	Daily or more than 3 times/week	325	95.1
<b>7-Do you drink milk</b>	Poor practice	56	14.7
	Good practice	324	85.3
<b>If yes</b>	Twice or trice/week	68	21.1
	Daily or more than 3 times/week	255	78.9
<b>8-Eating milk products</b>	Poor practice	37	9.7
	Good practice	343	90.3
<b>If yes</b>	Twice or trice/week	64	18.7
	Daily or more than 3 times/week	279	81.3
<b>9-Do you have a habit of drink coffee and or tea</b>	Poor practice	19	5
	Good practice	361	95
<b>If yes</b>	Other	6	1.6
	During or after a meal	338	93.8
	Right before meal	8	2.2
	2 hours or more before or after meals	9	2.4
<b>Total</b>		380	100

**Table (5): Practices about nutritional supplements and proteins among the studied pregnant women, Minia City, during the period from November 2016- March 2017. (N =380)**

		Frequencies	
		n	%
<b>10-Do you have an iron supplement</b>	Poor practice	34	8.9
	Good practice	346	91.1
<b>11- Do you have a folic acid supplement</b>	Poor practice	38	10
	Good practice	342	90
<b>If yes</b>	Do not know	17	5
	Later on	0	0
	Before pregnancy or within the first trimester	325	95
<b>12-Do you have a calcium supplement</b>	Poor practice	12	3.2
	Good practice	368	96.8
<b>13-Eating proteins of animal source</b>	Poor practice	5	1.3
	Good practice	375	98.7
<b>If yes</b>	Twice or trice/week	282	75.2
	Daily or more than 3 times/week	93	24.8
<b>14-Eating proteins of plant source</b>	Poor practice	7	1.8
	Good practice	373	98.2
<b>If yes</b>	Twice or trice/week	11	2.9
	Daily or more than 3 times/week	362	97.1
<b>Total</b>		380	100

**Table (6): Overall knowledge, attitude and practice scores about nutrition among the studied pregnant women, Minia City, during the period from November 2016- March 2017. (N =380).**

		Frequencies	
		n	%
<b>Knowledge</b>	Not knowledgeable	65	17.1
	Knowledgeable	315	82.9
<b>Attitude</b>	Negative attitude	156	41.1
	Positive attitude	224	58.9
<b>Practice</b>	Poor practice	157	41.3
	Good practice	223	58.7
<b>Total</b>		380	100

## Discussion

### Knowledge of mothers on maternal nutrition during pregnancy

In the current study, it was found that (74.2%) and (72.6%) had a good knowledge of the meaning and the components of the balanced diet respectively. This was higher than another study done in the USA by Latifa M et al., 2012 where 45.9% and 49.2% knew correctly neither the meaning nor the components of the balanced diet for the pregnant women.

In general according to the answers given by the respondents to the knowledge assessing questions, (82.7%) of respondents were knowledgeable about nutrition during pregnancy. This figure is higher than the study conducted in East Wollega (64.4%) and Malawi (70%) of pregnant women had knowledge on nutrition. This high nutritional knowledge might be due to good information about nutrition during pregnancy. Also, our present study was in disagreement with another study was conducted among adolescent pregnant women in Alexandria, Egypt showed that (61.7%) had poor knowledge about nutrition during pregnancy and their dietary intake did not meet et al.,<sup>1</sup> the nutritional requirements of pregnancy.

### As regard to attitudes of pregnant women regarding nutrition:

Our study demonstrated that 58.9% had a positive attitude, this in agreement with a study conducted in western Kenya by Perumal N. et al., (2011) that reported

59.6% of the pregnant women's attitude score was high (>7 out of 10).

Our study demonstrated that only 15.3% don't agree with the concept of eating for two (eat more food) and 19.7% don't agree with that a pregnant women must have more carbohydrates than non-pregnant that lower than reported by Latifa M et al., 2012 that 40.3% of women thought negatively that pregnant women should eat for two, also 44.4% thought that most of their diet (>3/4) must be of starchy food. Also, our present study was in agreement with another study conducted in India by Ajantha et al., 2015 where more than half of the participants (52%) reported that their food should comprise of starches, dairy products, meat and beans, also that majority of the participants (98%) agreed that a woman requires more nutrients at the time of pregnancy.

### As regard to practices of pregnant women regarding nutrition:

Our study showed that (18.7%), (90%) and (78.9%) of respondents had practices of following specific dietary regimen, habit of eating fresh vegetables and daily drinking of milk respectively which was higher (25.8%, 58.9% and 42.7% respectively) than the result of the study from America. It might be due to the culture and socio-economic difference.

The current study showed that: (96.6%) of respondents had 4 and above meal frequency/day, (85.3%) of the respondents had the habit of eating snacks between meals, (80%) of respondents had the habit



of eating more carbohydrates between meals during their pregnancy which was in disagreement with the study conducted in East Wollega, that revealed only (33.9%) of respondents had 3 and above meal frequency/day, the frequency of snack consumption per day was (40.1%) and (29.1%) of respondents had the habit of eating more carbohydrates between meals. This might be due to the difference in residence and economy.<sup>6</sup> Also, in agreement with a study conducted in India by Ajantha et al., 2015 revealed that (96%) of the participants did not eat any snacks.

Our study uncovered that (97.1%) had the habit of eating either plant or animal protein daily which was greater (42.7%) than the study conducted by Latifa and et al.,. This difference might be due to Egyptians use plant proteins to prepare their food. Concerning micronutrient supply; (91.1%) of women had iron tablets and took them correctly. But (90%) of women had folic acid supplies, of them (95%) took before pregnancy or within the first trimester. About (96.2%) of women had a calcium supplement, this agreed with a study done by Al-Hindasi et al., 2010 it was found that (71.2%) had received iron/folic acid tablets during last pregnancy. Comparing to other study conducted in Riyadh showed higher percent, where the majority (93.4%) of the total subjects were taking iron supplements during pregnancy.

In our present study about (95%) of respondents had taken folic acid before pregnancy or within the first trimester. This figure is much in agreement with the study result from Pakistan and Australia (51.25% and 81.6% respectively). The difference could be due to the socio-economic differences and the high coverage of preconception care in Egypt. Also, our present study was in agreement with another study conducted among pregnant women in Korea which found that; (26.4%) reported on the preconceptionally use of folic acid. Women with a university degree or higher education were more likely to be aware of folic acid and to take folic acid in the preconception period. This study showed that: (91.1%) of women had iron tablets and took them correctly and (90%)

of women had folic acid supplies, of them (95%) took before pregnancy or within the first trimester; that was in agreement with another study in Saudi Arabia which revealed that; Dietary supplement use among Saudi women in pregnancy was high (71.5%) and was significantly associated with level of education ( $p = 0.005$ ), family income ( $p = 0.039$ ) and number of children. Folic acid was found to be the most common type of dietary supplement used (95.9%); however, (53.1%) did not take folic acid supplements 3 months prior to pregnancy.

In our study there was there was a significant positive correlation between knowledge score and practice score ( $r=0.693$ ,  $p<0.001$ ) and this agreement with the study conducted by Abdel-Aziz S et al., 2018 who verified that nutrition knowledge was predictive of change in dietary habits and health advices encouraging expectant women to improve their food intake.

### Conclusion and Recommendation

Based on the findings of the present study, it can be concluded that: (82.9%) of women in the present study had adequate knowledge, (58.9%) had a positive attitude and (58.7%) had good practice about nutrition during pregnancy. There was a positive significant association between educational level of women, family income; associated diseases and nutrition knowledge during pregnancy. This study also showed that educational level of mothers, occupation, monthly average income, antenatal care visits, gestational age, birth spacing, and associated diseases had a statistical association with the practice of mothers on nutrition during pregnancy. Hence, nutrition intervention such as nutrition education in different villages, health centers, and women organizations should be given for the community particularly for the pregnant mothers concerning nutrition during pregnancy to increase the nutritional knowledge of mothers.

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