Assessment of Nutritional Patterns of Pregnant Adolescents in Aswan City

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Abstract

*Adolescent pregnancy is a worldwide health problem. It has been considered as a major health problem to pregnant women and their newly born babies especially in developing countries to the extent that it received considerable attention. **Objective:** To assess nutritional patterns of pregnant adolescents in Aswan City. **Settings:** Ten Maternal and Child Health (M.C.H) centers in Aswan city were randomly chosen from the available 36 M.C.H centers, affiliated to the Ministry of Health. **Subjects:** A convenience sample of 300 pregnant adolescents aged 15-21 years was selected from the previous settings, (30 from each MCH center). **Tool:** Adolescent pregnant women nutritional patterns structured interview schedule was developed by the researcher. It entailed the following parts: Part one: Socio-demographic and reproductive history. Part two: Nutritional patterns structured interview schedule that comprised: a. Knowledge about nutrition and elements of balanced diet. b. Factors affecting study subject's choice of food. c. Knowledge about risks of malnutrition. d. Nutritional behaviors or habits of pregnant adolescents. **Results:** A poor total score regarding knowledge about nutrition and elements of balanced diet was obtained by 58.0 % of the study subjects. Regarding factors that affect choice of food, nearly two thirds (63.3%) of the study subjects' husbands were responsible for buying food. Choosing food was the responsibility of wives among 57.3% of the study subjects More than two- thirds of the study subjects always had fresh fruits, vegetables and dairy products at home both. Regarding knowledge about risks of malnutrition. Less than two- thirds (65.0%) and slightly more than one third (34.0%) of the study subjects gained poor and fair total score grade (respectively). On the other hand, the vast majority (94.3%) of the study subjects gained good total score of nutritional habits. **Conclusion:** It was concluded that the majority of the study subjects gained good nutritional habits in spite of their poor knowledge. Many adolescents have poor diet quality and lack knowledge about the appropriate nutrition. As a result, engaging in unhealthy dietary practices. **Recommendations:** Improving the nutritional status of adolescent girls before and during pregnancy is recommended through providing necessary knowledge about the good eating habits and nutritional requirements. Enforce mass media should provide nutritional education programs to adolescents about importance of nutrition and risks of malnutrition especially for pregnant adolescents.*

Introduction

WHO, defined pregnancy as a unique feminine experience and a critical period during women's life cycle. It is a normal process which results in a series of physiological and psychological changes to the expectant mother. Adolescent pregnancy is a global problem. The incidence of adolescent pregnancy and adolescent birth is widely divergent. In recent decades adolescent pregnancy has become an important health issue in a great number of

countries. Worldwide, early childbearing is associated with higher risk of adverse reproductive outcomes among the youngest mothers and their newborns, as well as increased maternal and infant mortality [1-3].

Maternal physiological changes during pregnancy or adaptations are involving all body' systems. Every change is aimed for the maintenance of the pregnancy, the development of the fetus, and preparation for labor and birth. The psychological changes occur not only as a result of the physiological alternations that occur but also due to the added responsibility associated with the new person coming to the family. Pregnancy provides the time for the woman to be prepared for labor and birth experience, complete the tasks of pregnancy, and accomplish the role of mother. Motherhood is an irrevocable change in women's life, progressively becoming part of a woman's total identity. These psychological adaptations and development of the woman identity as a mother are crucial aspects of the childbearing cycle [4-6].

The total fertility rate in 2011 in some countries worldwide per 1000 women was as follows: the United States 1.9 women, the United Kingdom 2.0 women, South Africa 2.4 women, Tanzania 5.4 women, Jordan 3.4 women, Kuwait 2.7 women, and Iraq 4.1 women. In Egypt the total fertility rate of Egyptian women ranged from 2.85-2.9 children born/ 1000 woman between the year of 2011-2013 [7,8]. About 16 million girls aged 15–19 years old worldwide give birth each year. 95% of these births occur in the developing countries. The proportion of births that take place during adolescence in 2011/1000 girls is about 9 girls/1000 girls in china and 53 girls/1000 girls in South Africa. The UK has the highest teenage pregnancy rate in Western Europe that is as 26 girls/1000. In the United States of America, about 1 million teenagers or 5–8% of the teenage population become pregnant each year [9-11]. In the Arab region, one in seven girls marries before her being 18

years old age. The *Analysis of Demographic and Health Surveys in Egypt 2008* indicated that the teenage pregnancy rate varied from 1% in urban areas of Lower Egypt to 6% in rural areas of Upper Egypt. The rate of adolescent pregnancy in Egypt in 2011 was 44/1000 girls aged 15-19 years [12-15].

WHO defined adolescence as a time of age between 11 to 21 years old, when the lifestyle patterns of behavior are being formed. It is divided into three stages**:** *Early Adolescence (ages 11-14 years) which is called puberty period*, *Middle adolescence (ages 15-17) years* and *late adolescence (ages 18-21) years.* The adolescence period, is characterized by rapid physiological, psychological and social changes [16,17]. On the other hand, every adolescent has certain needs as, nutrition, sleep, rest, love, security, approval, independence, and self-expression. There is no doubt that nutrition is a basic human need and a cornerstone of good health and wellbeing across the entire life [18,19].

Adolescence is potentially a critical window for establishing healthy lifestyle choices and development of dietary behaviors that continue into adulthood and may decrease the risk of chronic diseases later in life [20,21]. Adolescence is a time of growth and development, with totally high nutrient needs. Dietary inadequacy is more common among adolescent especially for girls [22,23]. Moreover, adolescents are vulnerable to malnutrition because they are growing faster than any time after their first year of life. Many adolescents have poor diet quality and lack knowledge about the appropriate nutrition. As a result, engaging in unhealthy dietary practices and having erratic eating patterns that include high intakes of fast foods and foods high in fat, sugar, inadequate intake of calcium, and low intakes of fruits and vegetables [24,25]. These habits are risky especially for girls who may marry and become pregnant. These habits may not change during pregnancy, so they are likely to exhibit food preferences, eating behavior, and lifestyle

habits that are similar to their non-pregnant peers. So, special care should be given to nutritional inadequacy in pregnant female adolescents, to cope with the additional nutritional demands of pregnancy, childbirth and lactation as well as to their needs of nutrition to their growth and development as adolescents[26,27].

Pregnant adolescents face many complications such as: increased risk of preterm labor, intrauterine growth retardation, cesarean delivery, low birth weight, and increase maternal morbidity and mortality[28,29]. Multiple factors may influence an adolescent's susceptibility to eating and thus act as barriers to healthy eating. These factors are represented in two dimensions: the first one is the social factor, while the second dimension is represented in the economic factor. Social factors such as family, peer, and media are considered a powerful influence on food choice and nutrition-related behaviors for adolescents[30-32]. Parents are the primary source of nutritional information that has a strong influence on nutritional choices. The economic factors would have the greatest influence on the food choice of low-income adolescents. The low-income groups have a greater tendency to consume unbalanced diets[33,34].

Health professionals recognize that attention should be paid to monitor the nutritional status of vulnerable groups' especially pregnant female adolescents. Moreover, good nutrition is essential to help support a successful pregnancy and breast-feeding[35].

Aim of the Study
Assess nutritional patterns of pregnant adolescents in Aswan City.

Research Question:
What are the nutritional patterns of pregnant adolescents in Aswan City?

Operational Definition:
Nutritional pattern in this context means: a .Knowledge about nutrition and elements of balanced diet. b. Factors affecting their choice of food. c. Knowledge about risks of malnutrition. d. Behaviors or patterns of pregnant adolescents.

Materials and Method
Materials
Design: An exploratory descriptive design was used.

Settings: Data was collected from (ten) Maternal and Child Health (M.C.H) centers in Aswan city chosen randomly from the available 36 M.C.H centers, which are affiliated to the Ministry of Health.

Subjects: A convenient sample of 300 pregnant adolescents were conveniently selected from the previously mentioned settings, 30 from each MCH center and fulfilling the following criteria: Age ranged between: 15 to 21 a years old (middle &late adolescents). Normal pregnancy without ; previous or associated health problems.

Tool:
Tool I: Adolescents pregnant women nutritional patterns structured interview schedule

It was developed by the researchers after reviewing the related literature to collect the necessary data. It entailed the following parts:

Part One: Socio- demographic and reproductive history data: Socio-demographic data such as: age, level of education, occupation, age of marriage, marital status, , residence, type of family, number of family member, number of rooms, crowding index and income as well as parents' education. Reproductive health data such as: number of gravidity, number of parity, number of abortions, duration of present pregnancy, number of living

children, number of dead children, and type of last delivery.

Part Two: Nutritional patterns structured interview schedule: **A-** Knowledge about nutrition and elements of balanced diet. It consists of 16 questions. Subject response for each question: if correct and complete answer "2", correct and incomplete "1" and wrong and/or don't know answer "0". The total score ranges from 0 to 32 as follows: Poor knowledge (0<11); Fair knowledge (11-<22) Good knowledge (22-32). **B**- Factors affecting their choice of food. **C**- Knowledge about risks of malnutrition. It consists of 11 questions. Subject response for each question: correct and complete answer "2", correct and incomplete answer "1" and wrong and /or don`t know answer "0". The total score ranges from 0 to 22 as follows: Poor knowledge (0-<7); Fair knowledge (7-<14); Good knowledge (14-22). **D**-Behaviors or patterns of pregnant adolescents which contain 24 items to assess their nutritional habits during pregnancy. Each item is rated on a 3 -point Likert scale ranging from 1 to 3; never= (1); sometimes= (2); always= (3): for positive items while negative were reversed as, never= (3), sometimes= (2): always= (1). The total score ranged from 24–72 as follows: Bad habits (24<40), Fair habits (40-<56); Good habits (56- 72).

Method

- Approval was obtained from the ethical committee of the faculty of nursing- Alexandria University and the responsible authorities of the study settings.

- **Development of the tool:** Structured interview schedule was developed by the researcher after extensive review of recent literature. Then it was tested for content validity by five experts in the field of obstetric nursing in nursing faculty of Alexandria. The recommended modifications were

done and the final interview schedule was finalized. The tool was also tested for reliability by using "ALPHA CRONBECH" test. The result was .895 for nutritional knowledge and elements of balanced diet, 0.872 for knowledge of about risks of malnutrition, 0.805 for food available at home and 0.772 for nutritional habits which indicated an acceptable reliability for the tool.

- **Pilot study:** After the development of the interview schedule, a Pilot study was carried out on 30 pregnant adolescents (10%) of the study sample (these were excluded from the study sampel). **The purpose of the pilot study was to:** Ascertain relevance and content validity of interview schedule. Detect any problem peculiar to the statements as sequence and clarity that might interfere with the process of data collection. Estimate the time needed to complete the interview schedule. **Results of the pilot study:** After conducting the pilot study, it was found that the sentences of the interview schedule were clear and relevant; however, few words were modified. Following this pilot study the interview schedule was reconstructed and made ready for use.

- **Collection of data:** Each subject was individually interviewed before or after antenatal medical checkup. The researcher explained the purpose of the study to each pregnant adolescent.

Ethical considerations:

The nature and purpose of the study were explained to the subjects participating in the study. All information obtained from the participants was treated with the utmost confidentiality. Clarification of any point in the study was provided to the study subjects

if needed. Participants were also informed about their right to withdraw from the study at anytime without giving a reason. An oral consent to participate in the study was obtained.

Statistical Analysis

Statistical analysis was done by the researcher. After data were collected it was revised, coded and fed to statistical software IBM SPSS version 20. The given graphs were constructed using Microsoft excel software. All statistical analysis was done using two tailed tests and alpha error of 0.05. P value less than or equal to 0.05 was considered to be statistically significant. A descriptive and analytical statistics were used such as percentages. Pearson's chi square test to test the relationship between variables, Mont Carlo exact test and Fishers exact test were also used to alternatives for the Pearson's chi square test if there were many small expected values.

Results

Figure (1) demonstrates the percentage distribution of the pregnant adolescents according to their total scores of nutritional knowledge and elements of balanced diet. It was noticed that near three fifths (58.0%) of the study subjects gained poor total score. While only 1.0% of them gained good total score.

Table (1) clarifies the number and percentage distribution of the pregnant adolescents according to their nutritional knowledge and elements of balanced diet. It was obvious that 91.3%, 70.3%, 70.3%, 67.3%, 66.0% and 65.6% of the study subject answered wrong and/or don't know about the importance of fat, carbohydrates, iron, calcium, protein, and vitamins respectively. In addition, 88.7% and 70.3% of the study subjects answered correct and incomplete related to foods to be decreased or to be increased during pregnancy respectively. Moreover 73.3%, 66.3% and 66.0% of them answered correct and

incomplete about the most importance food rich in vitamins, iron and carbohydrates respectively. Finally, none of the subjects gave correct and complete answered related to all items of nutritional knowledge except (15.0%, 6.3%, 4.7%, 3.3%, 1.0% and 0.7%) answered correct and complete related to food to be increased during pregnancy, food rich in protein, food rich in calcium, food rich in fat, elements of healthy food, food that should be decrease during pregnancy and food rich in vitamins respectively.

Table (2) shows the number and percentage distribution of the pregnant adolescents according to factors that affect choice of food. Regarding family income, the table shows that more than one-half (52.6%) of the study subjects found it is not enough to satisfy their food needs. The table also shows that near two thirds (63.3%) of the husbands` of the study subjects are responsible for buying food, followed by wife and mother in low which constitute 16.7% for both. In addition, regarding choosing and preparing food, it was noticed that more than one half (57.3%) and the majority (92.0%) of the study subjects, the wife is the responsible person for choosing and preparing food.

Figure (2) displays the percentage distribution of the pregnant adolescents according to their total score of knowledge about risks of malnutrition. It was found that less than two thirds (65.0%) and slightly more than one third (34.0%) of the study subjects gained poor and fair total score respectively. While only (1.0%) of the study subjects gained good total score.

Table (3) illustrates the number and percentage distribution of the pregnant adolescents according to their knowledge about risks of malnutrition. It was found that the majority (91.3%) of the study subjects answered wrong and don't know about risks of vitamins deficiency in eating for mother during pregnancy, while 77.7%, 66.0%, 55.0% and 49.0% of the study subjects answered correct and incomplete about risks of lack of eating for mother

during pregnancy, risks of inadequate eating for fetus during pregnancy, risks of iron deficiency in eating for mother during pregnancy and risks of calcium deficiency in eating for mother during pregnancy respectively. In addition, only 36.7% and 17.0% give correct and compete answer about risks of calcium deficiency in eating for fetus during pregnancy and risks of increased food intake for fetus during pregnancy respectively.

Figure (3) illustrates the percentage distribution of the pregnant adolescents according to their total score of nutritional habits. It was found that the vast majority (94.3%) of the study subjects gained good total score and 5.7% of study subjects gained fair total score of their nutritional habits.

Table (4) illustrates the relationship between the nutritional knowledge and elements of balanced diet of the pregnant adolescents and their socio-demographic data. Regarding the age, it was noticed that 84.2%, 52.8, 55.1 of the study subjects who were in the age between 15 -< 17, 17-< 19, 19-21 years had poor total score of nutritional knowledge respectively while only (1.9%) of the study subjects, who were in the age between 19-21 years gained good total score. Adolescent age found to be associated with poor knowledge about nutritional knowledge and elements of balanced diet. There was a statistically significant correlation found between the nutritional knowledge of the study subjects and their age (P=0.005).

In relation to the educational level, (81.0%) of the study subjects who got university education gained fair total score. On the contrary, only (1.8%) of the study subjects who got secondary education gained good total score. There was a statistically significant correlation between the nutritional knowledge of the study subjects and their educational level (P=0.000).

Considering the occupation, it was obvious that less than two thirds (62.4%) and more than one third (37.6%) of the study subjects who were housewives gained poor and fair total score respectively regarding the nutritional knowledge. On the other hand only (8.8%) of the study subjects who were working gained good total score. There was a statistically significant correlation between the nutritional knowledge of the study subjects and occupation (P=0.000).

Concerning the age of marriage, it was found that less than two thirds (62.5%) of study subjects who married at the age 17 to -<19 years obtained poor total score, while only (5.2%) of study subjects who married at the age 19-21 years gained good total score. There was a statistically significant correlation between the nutritional knowledge of the study subjects and their age of marriage (P=0.007).

As regards the father's education, it was found that one half (50.0%) of the study subjects whose fathers got university education gained poor and fair total score respectively. Only (3.5%) of the study subjects whose fathers were illiterate gained good total score. There was a statistically significant correlation between the nutritional knowledge of the study subjects and their father's education (P=0.019).

As regards the mother's education, it was found that slightly less than three quarters (73.3%) of the study subjects whose mothers got university education, gained fair total score. Only (2.4%) of the study subjects whose mothers were illiterate gained good total score. There was a statistically significant correlation between the nutritional knowledge of the study subjects and their mother's education (P=0.009).

In relation to the type of the family, more than one half (58.8%) of study subjects who lived in a nuclear family gained poor total score regarding the nutritional knowledge. On the other hand

only (5.3%) of the study subjects whose crowding index <1 gained good total score There was a statistically significant correlation between the nutritional knowledge of the study subjects and their crowding index (P=0.007).

Moreover, one half (50.0%) of study subjects who had more than enough income, gained poor and fair total score respectively. However, there is no statistically significant correlation between the nutritional knowledge of the study subjects and their type of family as well as their income.

Table (5) illustrates the relationship between knowledge about risks of malnutrition of the pregnant adolescents and their socio-demographic data. Regarding the age, it was noticed that as much as (84.2%) of the study subjects, who were in the age between 15-<17 years gained poor total score regarding knowledge about risks of malnutrition. However, only (1.9%) of the study subjects, who were in the age between 19-21 years gained good total score. There was a statistically significant correlation between knowledge about risks of malnutrition of the study subjects and their age (P=0.019).

In relation to the educational level slightly more than one half (52.4%) of the study subjects who got university education, gained poor total score. On the other hand, only (3.6%) of the study subjects who got preparatory education, gained good total score. There was a statistically significant correlation between knowledge about risks of malnutrition of the study subjects and their educational level (P=0.004).

Considering the occupation, it was obvious that slightly more than two thirds (66.9%) of the study subjects who were housewives gained poor total score. On the other hand only (8.8%) of the study subjects who were working gained good total score. There was a statistically significant correlation between knowledge about risks of malnutrition of the study subjects and their job (P=0.000).

Concerning the age of marriage it was found that slightly less than two thirds (64.7%) of the study subjects who married at the age 17-<19 years obtained poor total score regarding knowledge about risks of malnutrition, while 2.8% of the study subjects who married at the age 15-<17 years gained good total score.

Regarding the father's education it was found that one half (50.0%) of the study subjects whose fathers got university education, gained poor and fair total score both respectively. Only (6.1%) of the study subjects whose fathers were just read and write gained good total score. There was a statistically significant correlation between knowledge about risks of malnutrition of the study subjects and their father's education (P=0.001).

As regards mother's education, it was found that slightly less than three quarters (73.3%) of the study subjects whose mothers got secondary education, gained poor total score. Only (6.4%) of the study subjects whose mothers were just read and write gained good total score. There was a statistically significant correlation between knowledge about risks of malnutrition of the study subjects and their mother's education (P= 0.009).

In relation to the type of the family, slightly less than two thirds (65.3%) of the study subjects who live in a nuclear family gained poor total score, while only 1.4% of them got good total score .

On the other hand, only (1.3%) of the study subjects whose crowding index 1- 2, gained good total score. However, more than one half (55.9%) of the study subjects who had more than enough income, gained poor total score. There was a statistically significant correlation between the knowledge about risks of malnutrition of the study subjects and their income (P=0.010). However, there is no statistically significant correlation between the knowledge about risks of malnutrition of the study subjects

and their age of marriage and their type of family as well as their crowding index.

Table (6) illustrates the relationship between the nutritional habits of the pregnant adolescents and their socio-demographic data. Regarding the age, it was noticed that the vast majority (98.1%) of the study subjects who were in the age between 19-21 years gained good total score regarding the nutritional habits, while (10.4%) of the study subjects who were in the age between 17-<19 years gained fair total score. There was a statistically significant correlation between the nutritional habits of the study subjects and their age (P=0.012).

In relation to the educational level all (100.0%) of the study subjects who were illiterate and who got university education gained good total score regarding nutritional habits both respectively. On the other hand (13.0%) of the study subjects who read and write gained fair total score regarding nutritional habits.

Considering occupation, it was obvious that the majority (94.7%) and (91.2%) of the study subjects who were housewives and working gained good total score regarding the nutritional habits respectively.

Concerning the age of marriage, it was found that 100 %, 96.3%, 88.7% of the study subjects who married at the age 19 – 21, 17-<19 and 15-<17 years obtained good total score respectively. There was a statistically significant correlation between the nutritional habits of the study subjects and their age of marriage (P=0.004).

Regarding the father's education, it was found that all (100 %) of the study subjects whose fathers got preparatory and university education gained good total score both respectively. As regards the mother's education, it was found that all (100.0%) of the study subjects whose mothers got preparatory and university education gained good total score both respectively.

In relation to the type of the family, the vast majority (94.9%) of the study subjects who lived in a nuclear family gained good total score of nutritional habits followed by 92.9% of the study subjects who lived in extended family. On the other hand, 100%, 93.9%, and 75.0% of the study subjects whose crowding index <1, 1-2, 3+ gained good total score of nutritional habits. There was a statistically significant correlation between the nutritional habits of the study subjects and their crowding index (P=0.003),

All the study subjects (100.0%) who had more than enough income gained good total score of nutritional habits. There was a statistically significant correlation between the nutritional habits of the study subjects and their income (p=0.000).

However, there is no statistically significant correlation between the nutritional habits of the study subjects and their education, their occupation, their father's education as well as their mother's education.

Discussion

Adolescence is a period of preparation for adulthood. During this time several keys of developmental tasks are undertaken. These include physical and sexual maturation, movement toward social and economic independence, as well as the development of identity[36]. Every adolescent has certain needs as, nutrition, sleep, rest, love, security, approval, independence, and self-expression[37]. Adolescent pregnancy introduces a multitude of concerns for both the mother and the fetus; one of these concerns is nutrition. Good nutrition is essential to help support a successful pregnancy and breast-feeding, and it is also vital for the mother and fetus. Women planning a pregnancy should follow a balanced nutrient-rich diet[26]. It affects the growing baby indirectly via maternal-fetal transfer, and directly during postpartum, via lactation. Pregnancy represents an ideal time for health promotion activities. Many women, including adolescents, are interested and

willing to change health behaviors hoping that they will deliver a healthy infant[38].

The present study revealed lack of nutritional knowledge and elements of balanced diet among the pregnant adolescents. Near to three fifths of the pregnant adolescent gained poor total score of nutritional knowledge (**figure 1**). This result is consistent with the findings of two other studies. Firstly, Yassin S et al. (2004)[39] they conducted study "Factors affecting dietary practices among adolescent pregnant women in Alexandria" indicated their 61.7% of the study subjects had poor knowledge about nutrition during pregnancy[39]. Secondly Shaaban S et al.'s (2009)[26] study titled "Nutritional Knowledge and Attitude of Adolescent School Girls Living in Cairo" who studied "Nutritional Knowledge and Attitude of Adolescent School Girls Living in Cairo" They reported that <50% of their study subjects had poor knowledge regarding nutrition. The similarity between the results of these studies may be related to the educational level of shaaban`s subjects, as half of them were in private secondary schools. He justified that there is a difference between the graduates from governmental school and the graduates from private schools, as private school graduates seem to be more knowledgeable in general[26].

On the contrary, the findings of Özünlü & Cetinkaya (2013)[40] who had studied "The relation between pregnant adolescents' attitudes toward nutrition and weight gain during pregnancy and hemoglobin level" had reported that (61.2%) of their study subjects had a good knowledge. Although the age of the study subjects in Özünlü & Cetinkaya is similar to the age of present study subjects[40]. Moreover, the finding of the current study revealed that around two thirds of the current study subjects answered correctly but incomplete about the source of food elements as carbohydrate, vitamins, iron and calcium as well as, more than one half of them don`t know the healthy food

groups (**table 1**). This finding is similar with the study of Daba G et al. (2013)[41] who studied "The assessment of knowledge of pregnant mothers on maternal nutrition and associated factors in Guto Gida Woreda, east Wollega zone, Ethiopia". His study revealed that less than two thirds (64.4%) of his study subjects were found to be knowledgeable about nutrition during pregnancy[41]. In contrast, Alam N et al. (2010) who studied "Nutritional status, dietary intake, and relevant knowledge of adolescent girls in rural Bangladesh" indicated that more than one-half of his study subjects could not name the main food sources of energy and sources of protein[42].

The current study revealed lack of knowledge about risks of malnutrition among all the pregnant adolescents. Less than two thirds of the pregnant adolescents gained poor total score of knowledge about risks of malnutrition as they couldn't answer the risks of inadequate nutrition during pregnancy (**figure 2 & table 3**). This finding is in harmony with the study of Daba G et al. (2013) who revealed that 65.2% of his study subjects didn't answer the question of inadequate nutrition can cause miscarriage and/or preterm birth[41].

The similarity between the present study and Daba may be attributed to that the two studies were done in the same economic status as more than three quarters of Daba's and the present study subjects had low income which prevented them to access knowledge. In addition, slightly less than two thirds of Daba's subjects were illiterate and therefore, they lacked the awareness about malnutrition and its risks during pregnancy[41].

Adolescence is an important time for establishing healthy dietary habits and enhancing nutritional habits during pregnancy which may improve birth outcomes[16]. The total score of nutritional habits was good by the majority of the current study subjects (**figure 3**). This finding is in accordance with, Wise et al.

(2011)[43] who studied "adolescent views of healthy eating during pregnancy". They reported that the pregnant adolescents ate three or more meals a day. The equivalence of good nutritional habits between the current study and Wise may be attributed to that pregnancy motivates pregnant adolescents to have good pregnancy outcomes and healthy children even though they are adolescents characterized by bad nutritional behaviors as well as low socioeconomic status[43].

On the contrary, the current finding is not in line with the study of Özünlü& Cetinkaya (2013)[40] who indicated that more than one half (57.1%) of their study subjects had fine total score of nutritional habits. This resulted from eating food that contained high fat, sugar and consume tea or coffee which led to unhealthy eating practices. The discrepancy between the present study and Özünlü& Cetinkaya may be attributed to that the study subjects` choice of food was influenced by taste, convenience and cost[39]. The current study revealed that the total score of nutritional habits was good by the majority of the study subjects, but near to three fifths of them gained poor total score of nutritional knowledge **(figure 1 & 3)**. It is known that pregnancy can enhance the woman`s dietary practice. It is also known that nutritional knowledge by itself may not be enough to encourage healthy dietary behaviors to reach good pregnancy outcomes.

In the current study revealed a relationship between the nutritional knowledge and socio demographic status of the study subjects. There was a statistically significant correlation between nutritional knowledge and elements of balanced diet of the study subjects and their age, educational level, occupation, age of marriage, crowding index, fathers and mothers education. On the other hand, there was no statistically significant correlation between the nutritional knowledge of the study subjects and their type of family as well as their income **(table 4)**. This finding is in

line with three studies. The first one is the study of Hassan M (2012)[44] who studied "Relationship between socio-economic characteristics, health status and nutritional awareness of pregnant women". It is worth mentioning that positive statistically significant correlation was found between the nutritional knowledge of her study subjects and the mother's education (P<0.01) as well as the father's education (P<0.05)[44]. The second one is the study of Daba G et al. (2013)[40] who indicated that there was a positive statistically significant correlation between nutritional knowledge of their study subjects and the educational status as well as their family income (P <0.001). This is may be attributed to the fact that near two thirds of their study subjects were illiterate and more than three quarters have low family income. The third one is of Mirsanjari M et al. (2012)[45] who studied "Relationship between nutritional knowledge and healthy attitude and practice during pregnancy". It showed that there was a statistically significant correlation between nutritional knowledge of the study subjects and their household size, occupation, educational level and monthly income[45].

The current study revealed a relationship between the knowledge about risks of malnutrition and socio demographic status of the study subjects. There was a statistically significant correlation between the knowledge about risks of malnutrition of the study subjects and their age, education, occupation, father education, mother education and income. On the other hand, there was no statistically significant correlation between the knowledge about risks of malnutrition of the study subjects and their age of marriage, type of family and crowding index **(table 5)**. This may be attributed to the fact that more than one third of the current study subjects gained no or low educational level which may be a problem to access knowledge about pregnancy and nutrition. In the current study there was a relationship between the nutritional habits and socio demographic

status of the study subjects. There was a statistically significant correlation between nutritional habits of the study subjects and their age, age of marriage, crowding index and income. On the other hand, there was no statistically significant correlation between nutritional habits of the study subjects and their education, job, father education, mother education and type of family **(table 6)**. Finally, pregnancy represents an ideal time for health promotion activities as well as improves nutritional behaviors. Adequate nutritional intake is important especially during pregnancy as well as for adolescent girls to have healthy pregnancy and desired birth outcomes. Therefore, attention should be taken to monitor the nutritional status of vulnerable groups' especially female adolescents. In addition, should be increased the nutritional knowledge of pregnant adolescents to be able practices their nutritional habits properly.

Conclusion

Based on the current study results, it can be concluded that the majority of the study subjects had poor knowledge regarding nutritional knowledge and elements of balanced diet; as well as knowledge about risks of malnutrition. The adolescent pregnant instead of their poor knowledge, the study revealed that the majority of them gained good nutritional habit.

Recommendations

1- Every chance should be used to educate adolescents about healthy food during antenatal follow up.

2- Mass media should provide nutritional education programs to counsel adolescents about importance of nutrition and risks of malnutrition.

3- Upgrading the nutritional information in primary and secondary school curriculum to include the needed information and guidelines for healthy food, elements of nutrition, and its importance for the mother and fetus.

4- Enforce training programs to be carried out for nurses working in antenatal units to enrich their knowledge regarding the importance of maternal nutrition during pregnancy and risks of malnutrition.
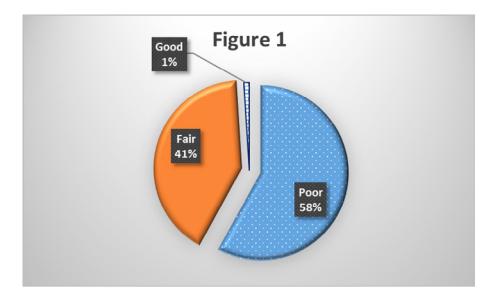
Figure (1): Percent distribution of the study subjects according to their total scores regarding nutrition knowledge and elements of balanced diet

Table (1): Number and percent distribution of the pregnant adolescents according to their nutritional knowledge and elements of balanced diet

Nutritional knowledge and element of balanced diet	Pregnant adolescents (n=300)					
	Wrong &/or don't know		Correct & Incomplete		Correct & complete	
	No.	%	No.	%	No.	%
What are the healthy food groups?	173	57.7	127	42.3	0	0.0
What are elements of the healthy food?	151	50.3	146	48.7	3	**1.0**
What are the foods you should increase during pregnancy?	44	14.7	211	**70.3**	45	**15.0**
What are foods you should decrease during pregnancy?	31	10.3	266	**88.7**	3	**1.0**
What is the importance of protein?	198	**66.0**	102	34.0	0	0.0
Which food is rich in protein?	109	36.3	172	57.3	19	**6.3**
What is the importance of carbohydrates?	211	**70.3**	89	29.7	0	0.0
Which food is rich in carbohydrates?	102	34.0	198	**66.0**	0	0.0
What is the importance of fat?	274	**91.3**	26	8.7	0	0.0
Which food is rich in fat?	150	50.0	140	46.7	10	**3.3**
What is the importance of Vitamins?	197	**65.6**	101	33.7	2	0.7
Which food is rich in Vitamins?	77	25.7	220	**73.3**	3	**1.0**
What is the importance of Iron?	211	**70.3**	89	29.7	0	0.0
Which food is rich in Iron?	101	33.7	199	**66.3**	0	0.0
What is the importance of Calcium?	202	**67.3**	98	32.7	0	0.0
Which food is rich in Calcium?	95	31.6	191	63.7	14	**4.7**

Mean±SD: 26.8±14.7

Table (2): Number and percent distribution of the study subjects according to factors that affecting choice of food

Factors that affect choice of food	(n=300)	
	No.	**%**
Family income		
More than enough	53	17.7
Just enough	89	29.7
Not enough	158	**52.6**
# Person who buys food		
Wife	50	16.7
Husband	190	**63.3**
Mother in law	50	16.7
Father in law	15	5.0
Adolescents mother	16	5.3
# Person who chooses food		
Wife	172	**57.3**
Husband	63	21.0
Mother in law	59	19.7
Father in law	3	1.0
Adolescents mother	18	6.0
# Person who prepares food		
Wife	276	**92.0**
Husband	9	3.0
Mother in law	14	4.7
Husband`s sister	15	5.0
Adolescents mother	16	5.3
Sister in law	3	1.0

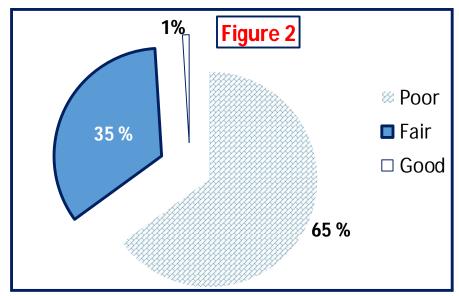# Categories are not mutually exclusive

Figure (2): Percent distribution of the study sample according to their total score of knowledge about risks of malnutrition

Table (3): Number and percent distribution of the pregnant adolescents according to their knowledge about risks of malnutrition

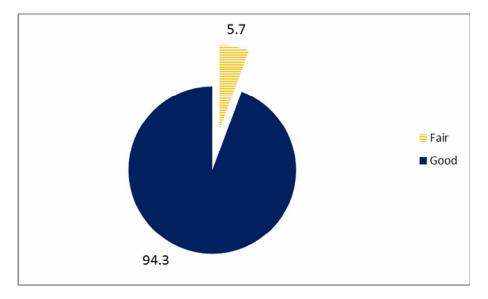| Knowledge about risks of malnutrition	Pregnant adolescents (n=300)					
	Wrong and Don't know		Correct and Incomplete		Correct and Complete	
	No.	%	No.	%	No.	%
Risks of inadequate eating for mother during pregnancy	67	22.3	233	**77.7**	0	0.0
Risks of lack of eating for fetus during pregnancy	99	33.0	198	**66.0**	3	1.0
Risks of increase food intake for mother during pregnancy	190	63.3	110	36.7	0	0.0
Risks of increase food intake for fetus during pregnancy	247	82.3	2	0.7	51	**17.0**
Risks of increase intake of pickles and spicy spices during pregnancy	203	67.7	76	25.3	21	7.0
Risks of iron deficiency in eating for mother during pregnancy	129	43.0	165	**55.0**	6	2.0
Risks of iron deficiency in eating for fetus during pregnancy	185	61.7	112	37.3	3	1.0
Risks of calcium deficiency in eating for mother during pregnancy	153	51.0	147	**49.0**	0	0.0
Risks of calcium deficiency in eating for fetus during pregnancy	168	56.0	22	7.3	110	**36.7**
Risks of vitamins deficiency in eating for mother during pregnancy	274	**91.3**	26	8.7	0	0.0
Risks of vitamins deficiency in eating for fetus during pregnancy	190	63.3	107	35.7	3	1.0

Mean±SD: 24.1±17.6

Figure (3): Percent distribution of the study sample according to their total score of nutritional habits#

The study subjects with bad nutritional habits were omitted

Table (4): The relationship between nutritional knowledge and elements of balanced diet of the pregnant adolescents and their socio-demographic data

Socio demographic data		Nutritional knowledge and elements of balanced diet						MCP
		Poor (174)		Fair (123)		Good (3)		
		No	%	No	%	No	%	
Age (In years)	15-	32	**84.2**	6	15.8	0	0.0	*0.005**
	17-	56	**52.8**	50	47.2	0	0.0	
	19-21	86	**55.1**	67	42.9	3	**1.9**	
Education	Illiterate	2	40.0	3	60.0	0	0.0	*0.000**
	Read and write	20	87.0	3	13.0	0	0.0	
	Preparatory school education	62	73.8	22	26.2	0	0.0	
	Secondary education	86	51.5	78	46.7	3	**1.8**	
	University education	4	19.0	17	**81.0**	0	0.0	
Occupation	Working	8	23.5	23	67.6	3	8.8	*0.000**
	Not working (Housewife)	166	**62.4**	100	**37.6**	0	0.0	
Age of marriage (years)	15-	59	55.7	47	44.3	0	0.0	*0.007**
	17-	85	**62.5**	51	37.5	0	0.0	
	19-21	30	51.7	25	43.1	3	**5.2**	
Father education	Illiterate	41	47.7	42	48.8	3	**3.5**	*0.019**
	Read and write	26	53.1	23	46.9	0	0.0	
	Preparatory school education	25	75.8	8	24.2	0	0.0	
	Secondary education	66	66.0	34	34.0	0	0.0	
	University education	16	**50.0**	16	**50.0**	0	0.0	
Mother education	Illiterate	72	58.1	49	39.5	3	**2.4**	*0.009**
	Read and write	20	42.6	27	57.4	0	0.0	
	Preparatory school education	26	66.7	13	33.3	0	0.0	
	Secondary education	52	69.3	23	30.7	0	0.0	
	University education	4	26.7	11	**73.3**	0	0.0	
Type of family	Nuclear	127	**58.8**	86	39.8	3	1.4	*0.469*
	Extended	47	56.0	37	44.0	0	0.0	
Crowding index	<1	29	50.9	25	43.9	3	**5.3**	*0.007**
	1-	139	60.2	92	39.8	0	0.0	
	3+	6	50.0	6	50.0	0	0.0	
Income	More than enough	34	**50.0**	34	**50.0**	0	0.0	*0.065*
	Hardly enough	100	56.5	74	41.8	3	1.7	
	Not enough	40	72.7	15	27.3	0	0.0	

MCP: P value based on Mont Carlo exact probability   * P < 0.05 (significant)

Table (5): The relationship between knowledge about risks of malnutrition of the pregnant adolescents and their socio-demographic data

Socio demographic data		Knowledge about risks of malnutrition						MCP
		Poor (195)		Fair (102)		Good (3)		
		No	%	No	%	No	%	
Age (years)	15-	32	**84.2**	6	15.8	0	0.0	*0.019**
	17-	61	57.5	45	42.5	0	0.0	
	19-21	102	65.4	51	32.7	3	**1.9**	
Education	Illiterate	5	100.0	0	0.0	0	0.0	*0.004**
	Read and write	20	87.0	3	13.0	0	0.0	
	Preparatory school education	60	71.4	21	25.0	3	**3.6**	
	Secondary education	99	59.3	68	40.7	0	0.0	
	University education	11	**52.4**	10	47.6	0	0.0	
Occupation	Working	17	50.0	14	41.2	3	**8.8**	*0.000**
	Not working (Housewife)	178	**66.9**	88	33.1	0	0.0	
Age of marriage (years)	15-	74	69.8	29	27.4	3	**2.8**	*0.054*
	17-	88	**64.7**	48	35.3	0	0.0	
	19-21	33	56.9	25	43.1	0	0.0	
Father education	Illiterate	53	61.6	33	38.4	0	0.0	*0.001**
	Read and write	28	57.1	18	36.7	3	**6.1**	
	preparatory school education	21	63.6	12	36.4	0	0.0	
	Secondary education	77	77.0	23	23.0	0	0.0	
	University or more education	16	**50.0**	16	50.0	0	0.0	
Mother education	Illiterate	82	66.1	42	33.9	0	0.0	*0.009**
	Read and write	26	55.3	18	38.3	3	**6.4**	
	preparatory school education	24	61.5	15	38.5	0	0.0	
	Secondary education	55	**73.3**	20	26.7	0	0.0	
	University or more education	8	53.3	7	46.7	0	0.0	
Type of family	Nuclear	141	**65.3**	72	33.3	3	**1.4**	*0.528*
	Extended	54	64.3	30	35.7	0	0.0	
Crowding index	<1	33	57.9	24	42.1	0	0.0	*0.067*
	1-	150	64.9	78	33.8	3	**1.3**	
	3+	12	100.0	0	0.0	0	0.0	
Income	More than enough	38	**55.9**	30	44.1	0	0.0	*0.010**
	Hardly enough	111	62.7	63	35.6	3	1.7	
	Not enough	46	83.6	9	16.4	0	0.0	

MCP: P value based on Mont Carlo exact probability   * P < 0.05 (significant)

Table (6): The relationship between nutritional habit of the pregnant adolescents and their socio-demographic data

Socio demographic data		Nutritional habit				MCP
		Fair (17)		Good (283)		
		No	%	No	%	
Age (years)	15-	3	7.9	35	92.1	0.012*
	17-	11	**10.4**	95	89.6	
	19-21	3	1.9	153	**98.1**	
Education	Illiterate	0	0.0	5	100.0	0.414
	Read and write	3	**13.0**	20	87.0	
	preparatory school education	5	6.0	79	94.0	
	Secondary education	9	5.4	158	94.6	
	University education	0	0.0	21	**100.0**	
Occupation	Work	3	8.8	31	**91.2**	0.398!
	not work (Housewife)	14	5.3	252	**94.7**	
Age of Marriage (years)	15-	12	11.3	94	**88.7**	0.004*
	17-	5	3.7	131	**96.3**	
	19-21	0	0.0	58	100.0	
Father education	Illiterate	6	7.0	80	93.0	0.266
	Read and write	3	6.1	46	93.9	
	preparatory school education	0	0.0	33	**100.0**	
	Secondary education	8	8.0	92	92.0	
	University or more education	0	0.0	32	**100.0**	
Mother education	Illiterate	8	6.5	116	93.5	0.084
	Read and write	6	12.8	41	87.2	
	preparatory school education	0	0.0	39	**100.0**	
	Secondary education	3	4.0	72	96.0	
	University or more education	0	0.0	15	**100.0**	
Type of family	Nuclear	11	5.1	205	**94.9**	0.490!
	Extended	6	7.1	78	92.9	
Crowding index	<1	0	0.0	57	**100.0**	0.003*
	1-	14	6.1	217	**93.9**	
	3+	3	25.0	9	**75.0**	
Income	More than enough	0	0.0	68	**100.0**	0.000*
	Hardly enough	3	1.7	174	98.3	
	not enough	14	25.5	41	74.5	

MCP: P value based on Mont Carlo exact probability   * $P < 0.05$ (significant)

!: P value based on Fisher Exact probability

The study subjects have no bad nutritional habits so it is omitted from the table

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