

Dietary Knowledge, Practices and Adequacy among Bedouin Pregnant Women

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Abstract

Introduction: Nutrition in pregnancy is usually socio-culturally shaped which marked by different beliefs and values. These beliefs and values yield taboos and myths that greatly shape their lifestyle. Therefore, understanding the client's culture is an important issue in a culturally congruent nutritional assessment and counseling. **Aim of the study:** to identify dietary knowledge, practices and adequacy among Bedouin pregnant women. **Research design:** A descriptive research design. **Setting:** The out-patient clinic of Marsa-Matrouh maternity hospital, Egypt. **Subjects:** A convenience sample of 320 pregnant women. **Tools:** Three tools were utilized for data collection: Tool I: Pregnant women's basic data structured interview schedule Tool II: Pregnant women's Dietary knowledge structured interview schedule and Tool III: Pregnant women's dietary practices structured interview schedule. **Results:** Only 4.7% of the study subjects have good knowledge about nutrition during pregnancy. As much as 81.6% of them had fair knowledge and only 13.8 % had poor knowledge. Moreover, there is a statistically significant positive correlation between subject's level of knowledge about nutrition during pregnancy and energy, protein, calcium and copper dietary adequacy(0.034, 0.052, 0.026, and 0.037, respectively.) **Conclusion:** the majority of the study subjects had fair level of knowledge about nutrition during pregnancy. Almost two-thirds of them had inadequate intake of most nutrients according to recommended dietary allowance (RDA) for pregnant women. Their level of knowledge about nutrition was positively correlated with their dietary adequacy.

Keywords: Maternal Nutrition, Bedouin, dietary knowledge, dietary adequacy.

1. Introduction

Maternal nutrition is a fundamental determinant of fetal growth, birth weight and infant morbidity. Consequently, insufficient, imbalanced nutrition and improper dietary practices during pregnancy cause serious conditions that affect both mother and her fetus such as premature birth, still birth .While for the mother, it leads to severe malnutrition and anemia. Anemia is the commonest hematological disorder that occurs in pregnancy. The severe form is associated with increased maternal morbidity and mortality which contributes to 20% of the maternal mortality in Africa. It also is associated with negative consequences for both the woman and neonate. Therefore, great effort is needed to develop/reassess and implement programs to control and prevent anemia during pregnancy. Adequate nutritional intake during pregnancy has been recognized as an important factor for healthy pregnancy and desired birth outcomes. It was found that nutritional deficiency during gestation supplies the fetus with suboptimal micro and macro nutrients. Consequently, inadequate intrauterine growth and development, inherited malformations, preterm deliveries, and pregnancy complications. Therefore, attention to appropriate dietary behavior and proper nutrient intake is recommended to supply adequate nourishment to achieve optimum health for both mother and child (Bawadi, H.A., 2010; Breymann, C et.al.2011).

Nutrition in pregnancy is usually socio-culturally shaped which marked by different beliefs and values. These beliefs and values yield taboos and myths that greatly shape their lifestyle. Therefore, understanding the woman's culture is an important issue in a culturally congruent nutritional assessment and counseling.

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Food taboos are considered as one of the factors contributing to maternal under-nutrition in pregnancy especially in rural and Bedouin areas and it is defined as a deliberate avoidance of a food items for reasons other than simple dislike from food preferences. A study conducted by **Oni and Tukur (2012)** found that adherence to cultural practices tended to be more consistent in youth (teenage) pregnancies and less educated women, as well as in women with a low body mass index. Another study showed that pregnant women in various parts of the world are forced to abstain from nutritious foods as a part of their traditional food habits and practices. **Meyer-Rochow, V.B. (2009)**. While others restrict their food intake during pregnancy for different reasons such as have smaller fetuses because smaller fetuses will carry a lower risk of delivery complications. **(Kuche, D., Singh, P& ,Moges, D. (2015)**

In the mid-west state of **Nigeria**, specifically in some parts of Ishan, Afemai, and Isoko Divisions pregnant women avoid snails. Whereas pregnant women of the Asaba Division are neither allowed to eat eggs nor drink milk. This is based on their fear of the development of bad habits among their coming child. While pregnant women tribal of the Ika division are also forbidden to consume porcupine as that is thought to cause a delay in labor. **Ugwa, E.A. (2016)** According to the Food and Nutrition Unit in the Nigerian Ministry of Planning and Economic Development milk, eggs, and goat's meat are the major food items prohibited during pregnancy in most parts of the country. The major reasons behind such avoidance were fear of abortion and discoloration of the fetal body. In addition to having a large baby leading to difficult labor. **Yang, Z., & Huffman, S.L. (2013)**

While pregnant women in **The Ghana**, avoid meat, snails and certain vegetables to avoid a drooling or a 'spirited' child. **Arzoaquoi, S.K., (2015)**. A study conducted in southern **Tanzania (2017)** revealed that 69% of the pregnant women avoid fish and farm meats. Foregoing of eggs in parts of Tanzania and throughout parts of Africa is to assuage fears related to the animal's characteristics being transferred to the child or sterility. **(Lennox, J., Petrucka, P., & Bassendowski, S. (2017)**. In **Brazil** pregnant women usually do not eat meat and fish at the same time during pregnancy due to the belief that such combinations can kill or cause harm such as congestion or vomiting. **Junges, C.F., Ressel, L.B., & Monticelli, M. (2014)**. While women in the southern part of **India** commonly avoid raw papaya during pregnancy because they believe that papaya can cause abortion. **Puri, S., & Kapoor, S. (2006)**. While **Mexican** women belief that eggs can make the baby smell bad. **Guzmán-Mercado(2016)**.

In **Egypt**, there are different subcultures in lower and Upper Egypt beside the Bedouin cultures in Sinai and Marsa-Matrouh. The latter subculture is marked by different beliefs and values. Bedouins are Arab nomadic communities, found throughout most of the desert extending from the Atlantic coast of the Sahara to the eastern coast of the Arabian Desert. They have traditionally avoided localized agricultural work. Sinai Bedouins suffer from poor living and environmental conditions. They live a nomadic lifestyle in search of food and water. Inadequate water supply leads to decreased food availability and income. Their dietary habits differ from people in other areas of Egypt and are mainly determined by socio-economic status and food availability. **AlBedah, A.M. (2016)**

Therefore, understanding the women's culture is an important issue in a culturally congruent nutritional assessment and counseling. A study done by **Kavle J et al(2014)** to assess cultural beliefs and perceptions of maternal diet and weight gain during pregnancy and postpartum family planning. It showed that Egyptian women during pregnancy favor diet high in proteins as well as essential vitamins and minerals. It also stated that a pregnant woman consider meat, fish, lentils, chicken, eggs, and milk, as well as various fruits and vegetables as essential foods for a healthy pregnancy. While Carbohydrates as a food group are viewed as "not beneficial" during pregnancy and were perceived to cause "bloating for the mother" and excessive weight gain. Therefore mothers believed they should restrict their intake. While Junk food and caffeinated beverages as well as salty and spicy foods are culturally considered taboo or bad during pregnancy. Specifically, chips cause worms for the fetus, salty foods create burning sensation when delivering the fetus and junk foods cause cancer of the blood. Mothers knowledge about the harmful effects of these foods from family members and health workers, as well as media sources (e.g., TV and the Internet), which are viewed as trusted sources of information on health. **Wen, L.M et al.....(2013)**

Most nutritional practices have stemmed from deeply rooted traditions and customs. It can lead to malnutrition, which is in turn linked to food insecurity, unhygienic practices and traditional beliefs. These beliefs are the products of social interactions and faith which are entrenched in the minds of the community. Many of these food practices arise from the ignorance about the nutritive value of food. **Lakshmi, G. (2013)**. So health care providers should be knowledgeable about importance of nutrition during pregnancy, nutritional beliefs, practices and potential hazards associated its deficiency during pregnancy especially in Bedouin areas. Such information will help them to identify nutritional problems and unhealthy dietary practices among this group.

Ultimately, they would gear their antenatal care towards encouraging healthy dietary practices, modifying some, and omitting unhealthy ones. Furthermore, preventing, early detecting and proper managing nutritional problems. This definitely would enhance maternal and fetal outcomes of pregnancy.

Aim of the study: this study aims to identify dietary knowledge, practice and adequacy among Bedouin pregnant women.

Research question: What are the dietary knowledge, practice and adequacy among Bedouin pregnant women?

2. Materials and Method

2.1. Materials

2.1.1. Research design: A descriptive research design was followed in this study.

2.1.2. Setting: This study was conducted at out-patient clinic of Marsa-Matrouh maternity hospital, Egypt. Where it is considered the only main setting for maternity care there.

2.1.3. Subjects: A convenience sample of 320 pregnant women was recruited from the previously mentioned setting according to the following criteria.

- Bedouin pregnant women.
- Willing to participate in the study.

Epi-info program was used to find the sample size applying the following parameters:

- 1- Population size = 960 for 3 months
- 2- Expected frequency = 50%
- 3- Acceptable error = 5%
- 4- Confidence co-efficiency = 95%
- 5- Minimal sample size = 294

2.1.4. Data collection tools: Three tools were utilized for data collection.

Tool I: Pregnant women's basic data structured interview schedule:

This tool was developed by the researchers and it entailed the following 3 parts:

Part one: Socio- demographic characteristics such as: age, level of education and occupation. In addition to her marital status, residence, family type and income.

Part two: Reproductive history such as: gravidity, parity, number of abortions, stillbirths, nature of previous pregnancies, labor and postpartum, number and sex of living children, as well as history of the present pregnancy.

Part three: Anthropometric measurements and biochemical assessment such as: weight (kg), height (cm), body mass index (BMI) and hemoglobin level.

Tool II: Pregnant women's Dietary knowledge structured interview schedule:

This tool was developed by the researchers and used to determine the pregnant women's nutritional knowledge such as: importance of healthy nutrition during pregnancy, sources and importance of each nutrient during pregnancy as well as sources of pregnant women's nutritional knowledge **Mugyia, A.S.N. et.al.....(2016)**. It contained 14 items. Subject's response for each item was recorded as (1) for wrong answer / don't know, (2) for correct but not complete answer and (3) for correct and complete answer. The total response for each subject ranged from 14-42. Accordingly: score < 23 poor knowledge, score 23- <32 fair knowledge and score \geq 32 good knowledge.

Tool III: Pregnant women's Dietary practice structured interview schedule: It includes two parts:

Part one: It was developed by the researchers to assess subjects' dietary practices during pregnancy. It includes four sections:

- Added foods & fluids.
- Increased foods & fluids.
- Decreased foods & fluids.
- Omitted foods & fluids.

Part two: A 24 hours dietary recall assessment sheet. This tool was originally developed by United States Department of agriculture (USDA) 2003 and Institute of Medicine, Food and Nutrition Board. It was adapted by the researcher and used to assess the quality & quantity of consumed food and fluids. **Hammond, K. (2008); Institute of Medicine, & Food and Nutrition Board. (2011); National Nutrition Institute. (2006).**

Method: The study was executed according to the following steps:

- 1-An Official letter was directed from the Faculty of Nursing, Alexandria University to Marsa Matrouh maternity hospital to obtain their permission to conduct the study and collect the necessary data after explaining its purpose.
- 2-Tool I, Tool II and tool III (part I) were developed by the researchers based on an extensive review of recent relevant and current literature.
- 3-Tool III (part II) was adapted, modified and translated into Arabic language by the researchers to suit the Egyptian culture.
- 4-Tools' content validity was tested by a jury of five experts in the field of obstetric and gynecologic nursing.
- 5-Tool's reliability (internal consistency) was tested by Cronbach's -Alpha test and the result was reliable (0.77).
- 6-A pilot study was carried out on 32 pregnant women (excluded from the study subjects) from the previously mentioned setting to assure the feasibility of the study, clarity and applicability of the tools, identify obstacles and to calculate the time needed to complete the tool. After pilot study, the tool was revised, reconstructed and made ready for use.
- 7-Each woman was individually interviewed for 15-20 minutes by the researcher. Three days per week (from 8:30 am to 1:30 pm) were specified for data collection over a period of four months, started from the beginning of January till the end of April 2018. An average of 10-11 interviews was performed per day.
- 8-The dietary practices were evaluated by assessing the food eaten during previous 24-hour dietary intake in three consecutive days. The findings of dietary intake were analyzed using Egypt Food Composition Tables of the National Nutrition Institute to get the mean daily intake of energy, total macronutrients and specific micronutrients such as iron, calcium, zinc, folic acid, vitamin A and vitamin C. Subsequently, the nutrient adequacy was calculated by comparing this dietary intake with Dietary Reference intake (DRI) of energy and macronutrients, calcium, iron, zinc, vitamin A, folic acid, and vitamin C. Nutrient density for macronutrients of consumed diet were also calculated to assess the quality of diet. The total score of dietary practices were compared with recommended dietary intake and the guide which is developed by Department of Agriculture provided by the United States Department of agriculture (USDA) 2003, Institute of Medicine, Food and Nutrition Board.
- 9- Statistical analysis: Collected data was revised, categorized, coded, computerized, tabulated and analyzed by statistical package for social sciences (SPSS) version 16. The given graphs were constructed using Microsoft excel software version 2010.

The following statistical measures were used:

- Frequency and percentage used for describing and summarizing categorical variables.
 - Cross tabulation was used with percentages to explore relationships between variables.
- 1-Appropriate tests were used such as chi-square and monte-carlo technique to measure association between variables.
 - 2-Using student t-test and one-way ANOVA test to compare between nutritional knowledge score and subjects' characteristics.

Ethical consideration: For each recruited subject the following issues will be considered: securing the subject's informed written consent after explanation of research purpose, keep anonymity, privacy and right to withdraw at any time as well as assuring confidentiality of the collected data.

3. Results:

According to table (I) almost one-half (51.3%) of the study subjects were 20-<35 years old. Nearly one- third (35.0%) of them were teenagers. Only 13.7 % of them were 35 years or more. While 49.4% of them were either illiterate or just able to read and write. Slightly less than one- third (30.9%) had a primary education and 12.5% of them had secondary education. A minority (7.2%) of them had high education. As much as 78.8% of them were housewives, 13.4% were employees and only 7.8 % were workers. Nearly two – thirds (68.4%) of them perceived their family income as enough, 24.1% did claim that it is not enough. Only 7.5 % of them thought that their family income was more than enough. Slightly More than one-fourths (28.4 %) of them lived in extended families.

Table (I): Distribution of the study subjects according to their socio demographic characteristics

Socio-demographic characteristics	N(320)	%
Age (years):		
▪ <20	112	35.0
▪ 20 - <35	164	51.3
▪ ≥35	44	13.7
-Level of education:		
▪ Illiterate / Read &write	158	49.4
▪ Primary school	99	30.9
▪ Secondary education	40	12.5
▪ University or above	23	7.2
-Occupation:		
▪ House wife	252	78.8
▪ Employee	43	13.4
▪ Worker	25	7.8
-Income (her point of view):		
▪ Enough	219	68.4
▪ Not enough	77	24.1
▪ More than enough	24	7.5
-Type of family:		
▪ Nuclear	229	71.6
▪ Extended	91	28.4

According to table (II) the majority (99.1%) of the study subjects had three daily meals, More than one-half (59.4%) of them had one daily snack, nearly one- third (30.9%) of them had two daily snacks and only 9.7 % of them had no daily snack. Approximately one-half (47.5 %, 46.9 %) of them were either over-weight or obese (respectively). While only 5.6% of them had normal weight. *the Institute of Medicine (IOM) recommended weight gains during pregnancy based on pre-pregnancy BMI. These recommendations are for BMI < 19.8 kg/m² total weight gain between 12.5 to 18 kg; BMI =19.8 to 26.0 kg/m² total weight gain between 11.5 to 16 kg; BMI > 26.0 to 29.0 kg/m² total weight gain between 7.0 to 11.5kg. and for BMI > 29.0 kg/m² total weight gain of 7.0kg.* As much as two-thirds (67.5%) of them had moderate anemia during pregnancy compared to only 32.5% of them who had normal level of hemoglobin.

Table (II): Distribution of the study subjects according to their nutritional history and anthropometric measurements

Nutritional history and Anthropometric measurements	N(320)	%
- Number of meals:		
▪ Two meals	3	0.9
▪ Three meals	317	99.1
- Number of snacks:		
▪ None	31	9.7
▪ Once	190	59.4
▪ Twice	99	30.9
- BMI:		
▪ Normal	18	5.6
▪ Overweight	152	47.5
▪ Obese	150	46.9
- Hemoglobin level: #		
▪ Normal	104	32.5
▪ Moderate anemia	216	67.5

WHO classification of anemia during pregnancy:

- Normal if Hb level >11g/dl.
- Moderate anemia if Hb level (7-10.9g/dl).
- Severe anemia if Hb level (4-6.9g/dl).
- Very severe anemia if Hb level (<4g/dl).

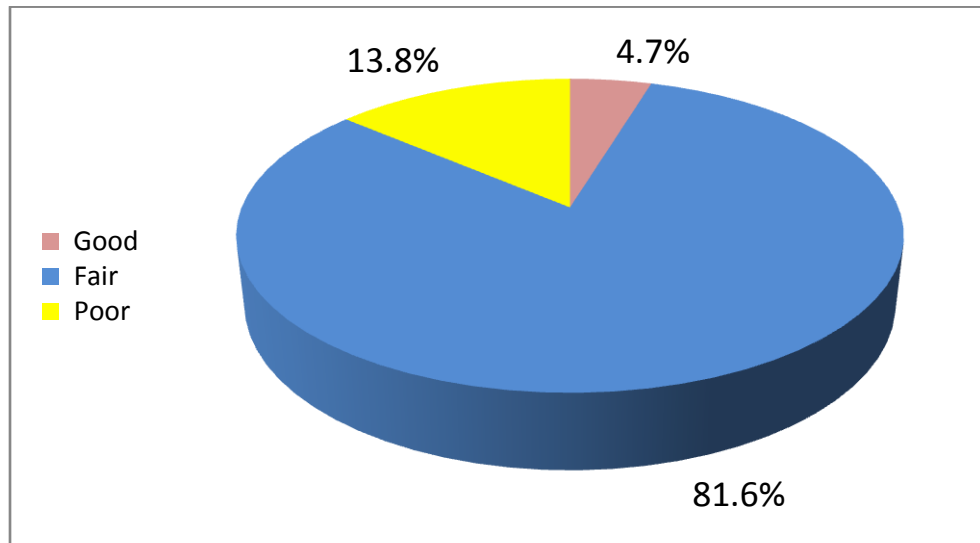


Figure (1): Number and percent distribution of the study subjects according to their level of knowledge about nutrition during pregnancy

According to figure (1) unfortunately only 4.7% of the study subjects have good knowledge about nutrition during pregnancy. As much as 81.6% of them had fair knowledge and only 13.8 % had poor knowledge.

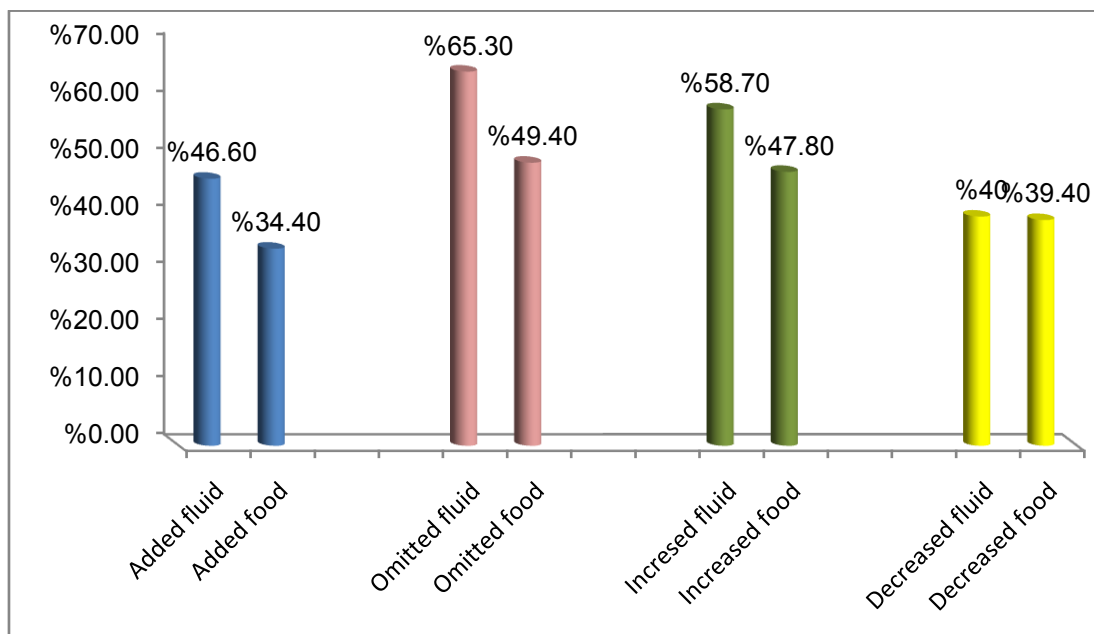


Figure (2): General distribution of the study subjects according to Added, Omitted, Increased, Decreased food and fluid items

Added: woman wasn't eating this item before and she added it during pregnancy.

Increased: woman was eating this item before, but she increased its amount during pregnancy.

Figure (2) shows the nutritional behavior of the study subjects. Almost two-thirds (65.3%) of them had omitted some fluids during pregnancy and 58.7% of them had increased fluids intake. Nearly one-half (49.4%) had omitted some foods, while a close percentage of them had increased their foods and added some fluids intake (47.8% and 46.6%, respectively). Two-fifths (40.0%) of them had decreased fluids intake. While as (39.4%) of them had decreased some food items during their pregnancy. Almost one-third (34.4%) of them had added foods.

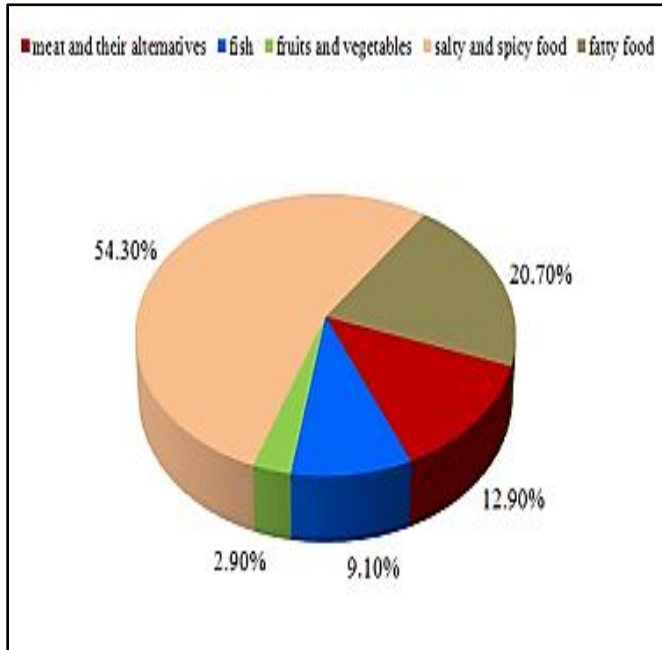


Figure (3): Added food items (n = 110)

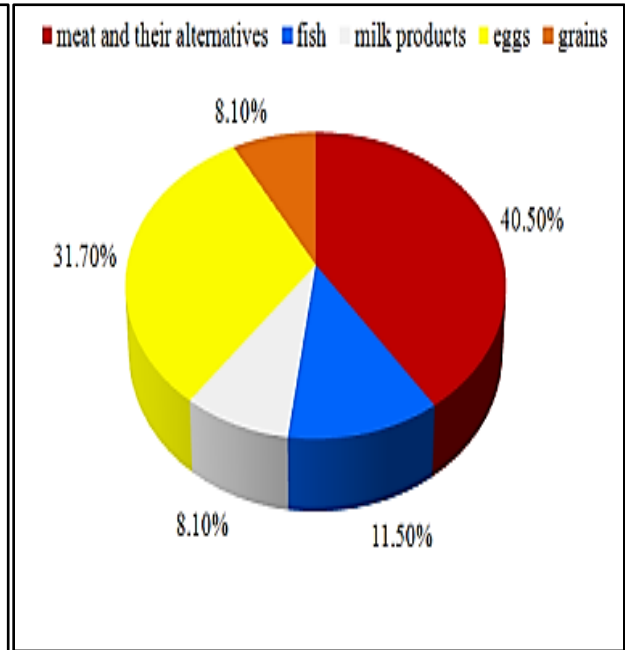


Figure (4): Omitted food items (n = 158)

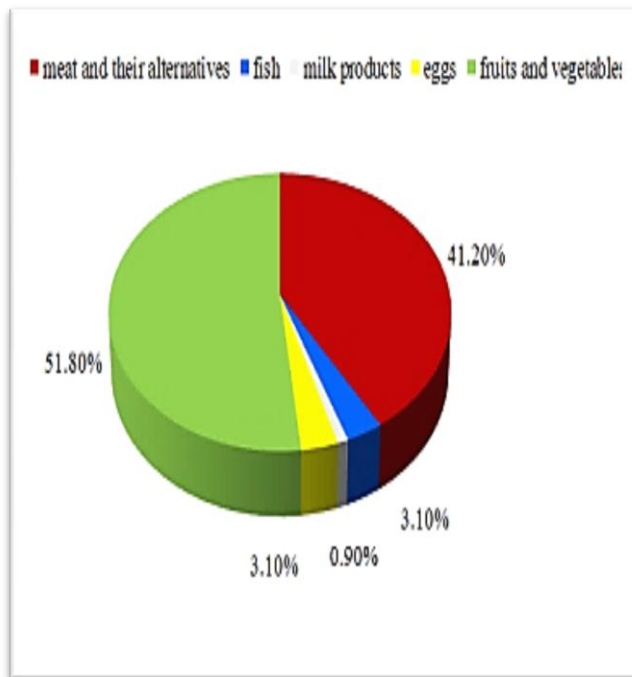
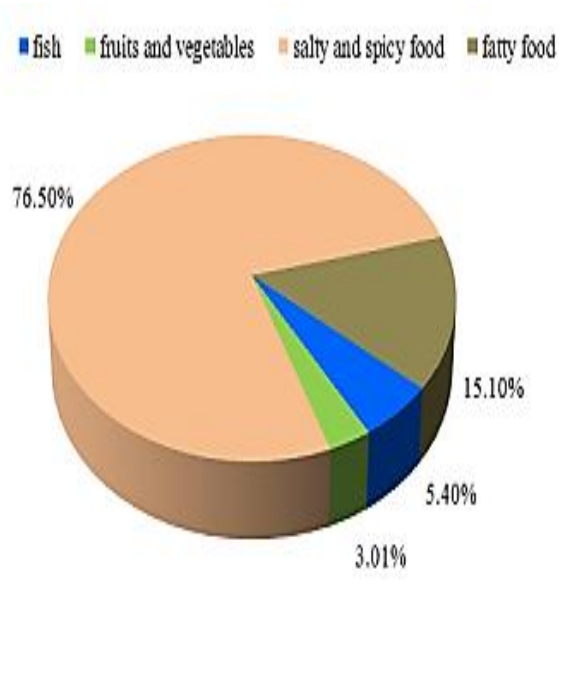


Figure (5): Increased food items (n = 153)



Figure(6): Decreased food items (n = 126)

According to figures (3-6) almost two-fifths (40.5%) of the study subjects added meat and their alternatives to their food, while 12.9% of them omitted it and 41.2% of them increased it. Nearly one-tenth (11.5%) of the study subjects added fish. While 9.1% of them omitted it. A minority (3.1%) of them increased it and only 5.4% of them decreased it. Only 8.1% of the study subjects added milk products (cheese and yogurt) to their diet. Almost none (0.9%) of them increased it. Approximately one-third (31.7%) of the study subjects added eggs, while a minor percent (3.1%) of them increased it. Less than one-tenth (8.1%) of the study subjects added grains. Approximately one-half (51.8%) of them increased fruits and vegetables. As much as 54.3% of the study subjects omitted salty and spicy food during pregnancy. A majority (76.5%) of them decreased it. About one-fifth (20.7%) of the study subjects omitted fatty food and only 15.1% of them decreased it.

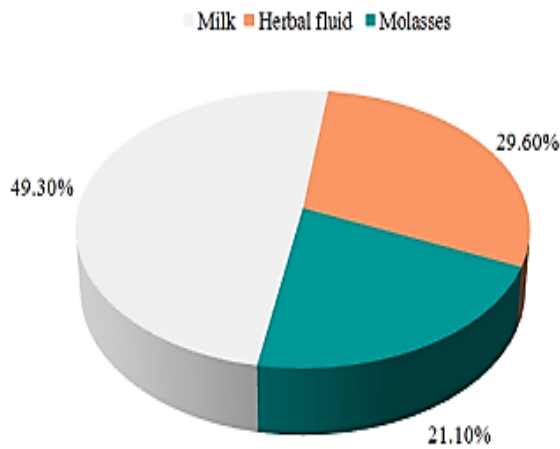


Figure (7): Added fluid items (n = 149)

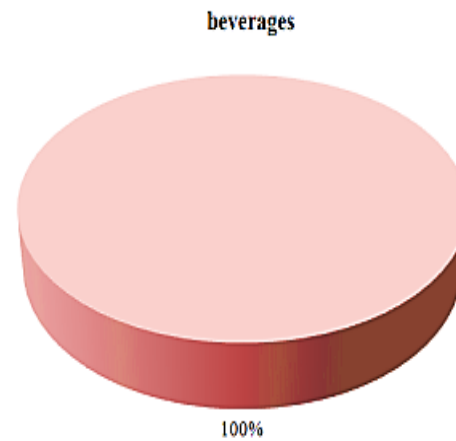


Figure (8): Omitted fluid items (n = 209)

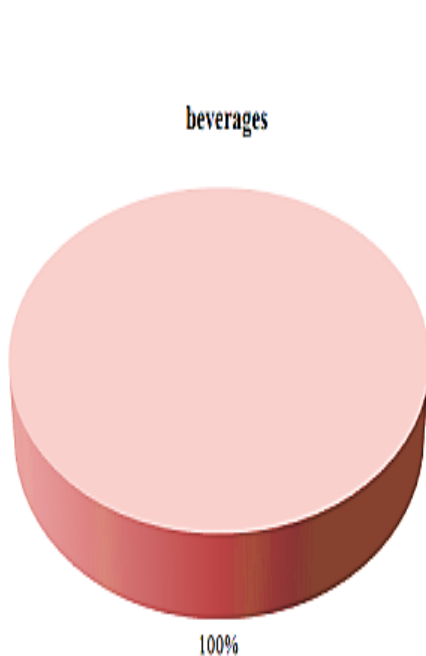


Figure (9): Increased fluid items (n = 188)

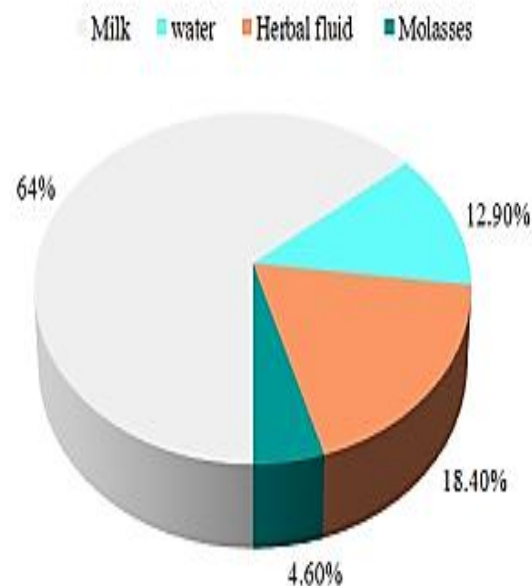


Figure (10): Decreased fluid items (n = 128)

Figures (7-10) demonstrates that almost one-half (49.3%) of the study subjects added milk to their fluids intake during pregnancy. About two-thirds (64%) of them increased it. Minor percent (12.9%) of the study subjects increased water 4.6% of them increased it. All study subjects either omitted or decreased caffeinated beverages intake during pregnancy.

Table (III) demonstrates that only 35.6% of the study subjects had adequate caloric intake (energy). Yet, the majority (88.8%) of them had adequate intake of phosphorus. Slightly more than one-half (58.1%, 56.9%) of them had adequate intake of both sodium and protein, respectively. About two-fifths (44.1) of them had adequate intake of zinc and Almost one-third (32.5%) of them had adequate intake of copper. Nearly one-fifth (17.8%) of them had adequate intake of calcium. While minor percents (16.6%, 12.2%, 7.5%) of them had adequate intake of vit B2, B1, C, respectively. Only 1.3% of them had adequate intake of iron. Almost none (0.3%) of them had adequate intake of potassium and magnesium.

Table (III): Distribution of the study subjects according to their dietary adequacy

dietary adequacy#	Inadequate		Adequate	
	No.	%	No.	%
Energy (kcal)	206	64.4	114	35.6
Protein (g)	138	43.1	182	56.9
Vitamin C (mg)	296	92.5	24	7.5
Vitamin B1 (mg)	281	87.8	39	12.2
Vitamin B2 (mg)	267	83.4	53	16.6
Sodium (mg)	134	41.9	186	58.1
Potassium (mg)	319	99.7	1	0.3
Calcium (mg)	263	82.2	57	17.8
Phosphorus (mg)	36	11.3	284	88.8
Magnesium (mg)	320	100.0	0	0.0
Iron (mg)	316	98.8	4	1.3
Zinc (mg)	179	55.9	141	44.1
Copper (mg)	216	67.5	104	32.5

$$\# \text{ adequacy percent} = \frac{\text{dietary intake}}{\text{Recommended dietary allowance (RDA)}} \times 100.$$

If score $\geq 100\%$ is adequate. / If score $< 100\%$ is inadequate

According to table (IV) there is a statistically significant positive correlation between subject's level of knowledge about nutrition during pregnancy and energy, protein, calcium and copper dietary adequacy (0.034, 0.052, 0.026, and 0.037, respectively). Where almost two-fifth (40%, 38.3%) of the study subjects with good and fair level of knowledge had adequate intake of energy compared to only 18.2% of them with poor level of knowledge. In relation to protein, a majority (86.7%) of study subjects with good level of knowledge had adequate intake of protein compared to (55.9%, 52.3%) of those with fair and poor level of knowledge, respectively. Adequate intake of calcium was more obvious among pregnant women with good level of knowledge 40% compared to only 18% and 9.1% of those with fair and poor level of knowledge (respectively). Adequate intake of copper is also more evident among 40% of pregnant women with good level of knowledge compared to only 34.9% and 15.9% of those with fair and poor level of knowledge, respectively.

Table (IV): Relationship between pregnant women’s nutritional knowledge and their dietary adequacy.

Dietary adequacy	Knowledge level						χ^2	P
	Poor (n = 44)		Fair (n = 261)		Good (n = 15)			
	No.	%	No.	%	No.	%		
Energy (kcal)								
-Inadequate	36	81.8	161	61.7	9	60.0	6.786*	0.034*
-Adequate	8	18.2	100	38.3	6	40.0		
Protein (g)								
-Inadequate	21	47.7	115	44.1	2	13.3	5.901	0.052*
-Adequate	23	52.3	146	55.9	13	86.7		
Vitamin C (mg)								
-Inadequate	42	95.5	239	91.6	15	100.0	1.133	MCp=0.613
-Adequate	2	4.5	22	8.4	0	0.0		
Vitamin B1 (mg)								
-Inadequate	40	90.9	227	87.0	14	93.3	0.993	0.609
-Adequate	4	9.1	34	13.0	1	6.7		
Vitamin B2 (mg)								
-Inadequate	39	88.6	216	82.8	12	80.0	1.076	0.584
-Adequate	5	11.4	45	17.2	3	20.0		
Sodium (mg)								
-Inadequate	20	45.5	110	42.1	4	26.7	1.665	0.435
-Adequate	24	54.5	151	57.9	11	73.3		
Potassium (mg)								
-Inadequate	44	100.0	260	99.6	15	100.0	1.986	MCp=1.000
-Adequate	0	0.0	1	0.4	0	0.0		
Calcium (mg)								
-Inadequate	40	90.9	214	82.0	9	60.0	7.337*	0.026*
-Adequate	4	9.1	47	18.0	6	40.0		
Phosphorus (mg)								
-Inadequate	4	9.1	31	11.9	1	6.7	0.274	MCp=0.934
-Adequate	40	90.9	230	88.1	14	93.3		
Magnesium (mg)								
-Inadequate	44	100.0	261	100.0	15	100.0	-	-
-Adequate	0	0.0	0	0.0	0	0.0		
Iron (mg)								
-Inadequate	42	95.5	259	99.2	15	100.0	4.009	MCp=0.155
-Adequate	2	4.5	2	0.8	0	0.0		
Zinc (mg)								
-Inadequate	27	61.4	147	56.3	5	33.3	3.651	0.161
-Adequate	17	38.6	114	43.7	10	66.7		
Copper (mg)								
-Inadequate	37	84.1	170	65.1	9	60.0	6.571*	0.037*
-Adequate	7	15.9	91	34.9	6	40.0		

χ^2 : Chi square test MC: Monte Carlo

p: p value for comparing between the three categories / *: Statistically significant at $p \leq 0.05$

4. Discussion

Pregnancy is one of the most critical and unique periods in women’s life cycle. It is regarded as a “welcome event” for successful motherhood. Yet during pregnancy women’s body goes through dramatically changes, among which malnutrition with its negative consequences. Therefore, pregnant women need adequate nutritious diet to avoid malnutrition.

Malnutrition is a leading cause of maternal and fetal complications in developing countries, where food insecurity is the predominant cause of malnutrition. In these cases, the traditions and cultural beliefs that surround nutritional practices during pregnancy have massive impact on women's nutritional status and outcomes of their pregnancies. **Ajantha, Singh, A.K., Malhotra, B., Mohan, S.K., & Joshi, A. (2015)** Accordingly, knowledge of dietary practices among pregnant women is important to decrease maternal and neonatal mortality rates. The purpose of this study was to identify dietary knowledge, practices and adequacy among Bedouin pregnant women.

Women's knowledge about nutrition during pregnancy:

The present study revealed that a minority (4.7%) of the study subjects had good level of knowledge about nutrition during pregnancy. This percentage is much more less than the findings of other two studies: *Firstly*, **Tenaw Z et al (2018)** who did a study titled "nutritional knowledge, attitude and practices among pregnant women who attend antenatal care at public hospitals of **Addis Ababa, Ethiopia**". They reported that 27% of their participants had good level of knowledge about maternal nutrition during pregnancy. *Secondly*, **Rahmiwati A (2015)** who had conducted a study titled "Contributions Knowledge of nutrition and dietary restriction to nutritional status of Pregnant Women in **South Sumatera, Indonesia**". It reported that 17.5% of its participants had good level of knowledge about nutrition during pregnancy.

However, four other studies had indicated higher percentages (more than one-half) of their subjects who had good knowledge about nutrition during pregnancy. *Firstly*, **Lim Z.X et al (2018)** who had conducted a study to assess "knowledge of nutrition during pregnancy and associated factors among antenatal mothers in **Malaysia**". They reported that about two-third (63.6%) of their participants had good knowledge level. *Secondly*, **Amanuel N et al (2018)** who had conducted study titled "Dietary practices and associated factors during pregnancy in northwestern, **Ethiopia**". They revealed that 61.4% of their participants had good dietary knowledge. *Thirdly*, **Oluleke M O. et al (2016)** who had conducted a study titled "Dietary intake knowledge and reasons for food restriction during pregnancy among pregnant women attending primary health care centers in Nigeria.

They had reported that about three-fourths (75.5%) of their participants had good knowledge. *Fourthly*, **Keвер et al. (2015)** who had done a study to assess "Knowledge and attitude of pregnant women towards dietary practices in Yerwa Clinic, Nigeria.". Their results reported that 65.3% of their participants had good knowledge about dietary practices during pregnancy. The discrepancy between the findings of the present study and those of the previously mentioned ones could be attributed to the fact that most of the current study subjects were housewives from Bedouins areas, illiterate or had only primary education. While most of the participants in the other previously mentioned studies we reemployed with higher educational level. Generally speaking, education paves the way for increasing knowledge regarding preventive aspects during pregnancy. Where educational level is expected to have a significant impact on nutritional knowledge. Beside the fact that educated women have better access to information from mass media and other resources.

Dietary practices among pregnant women:

The present study revealed that only 12.9% of its subjects had omitted meat and their alternatives. This finding is somewhat in line with the results of two other researchers: *Firstly*, **Duxbury A et al (2017)** who had investigated "Dietary habits and supplementation practices of young women during pregnancy, in **UK**". They had reported that 22.7% of their participants had avoided red meat during pregnancy. *Secondly*, **Salih S et al (2015)** who had investigated "Anemia and dietary habits among pregnant women in **Jazan, Saudi Arabia**". They reported that about one-fourth (25.2%) of their participants omitted meat during pregnancy.

The present study revealed that almost equal percent (41.2%, 40.5%) of the study subjects either increased or added meat and their alternatives during pregnancy, respectively. This finding is consistent with results of three other studies: *Firstly*, **Qureshi Z et al (2015)** who had conducted a study titled "Diet intake trends among pregnant women in rural area of Rawalpindi, **Pakistan**". They had reported that about one-half (46.4%) of their participants added some foods like meat and chicken. *Secondly*, **Ademuyiwa M.O et al (2013)** who had conducted a study titled "consumption pattern and dietary practices of pregnant women in Odeda local Government area of Ogun state, **Nigeria**". They had reported that 58% of their respondents consumed meat on daily basis. *Thirdly*, **Taleb S et al(2011)** who had investigated "Assessment of Nutritional Status of Pregnant Women Attending the City Tebessa PMI, **Algeria**. They had reported that the majority (76.92%) of their subjects consumed meat during pregnancy.

Simultaneously, the same finding is inconsistent with findings of **Forbes LE. et.al (2018)** who had conducted a study to assess “dietary change during pregnancy and women’s reasons for change, **Canada**”. They had reported that more than one-half (54.9%) of their participants had omitted meat and their alternatives, while 17.7% of them had increased it and only 3.2% of them added it. This contradiction between the current study and the Canadian one may be attributed to the fact that the collected information regarding dietary practices reflects pregnant women’s perceptions of the changes they had made and their beliefs about why changes were made. Where the majority of the current study subjects did either added or increased their intake of meat and their alternatives because they had the assumption that meat and their alternatives help in building fetal bone formation and development. While in the Canadian study, the majority of their participants did either omitted or decreased intake of meat or their alternatives because of their complaining of nausea and aversion.

The current study revealed that a minority (9.1%) of the study subjects had omitted fish during pregnancy because of pica and allergy. This finding is incongruent with the findings of **, Sholeye Oet.al (2014)** who had done a study to assess “dietary habits of pregnant women in **Ogun state, Nigeria**”. They revealed that about one-fifth (19%) of their participants had avoided some foods during pregnancy, including: beans, egg, and fish.

The present study revealed that about one-half (51.8%) of its participants had increased their intake of fruits and vegetables during pregnancy in order to improve digestion and appetite. This finding is consistent with results of four other studies: *Firstly*, **Fasola O et. al (2018)** who had conducted a study titled “knowledge, attitude and practice of good nutrition among women of childbearing age in **somolu local government, lagos state, Nigeria**”. They had reported that 56.15% of their respondents ate fruits and vegetables ≥ 4 times per day. *Secondly*, **Catherin N et.al (2017)** who had conducted a study titled “beliefs and practices regarding nutrition during pregnancy and lactation in **India**”. They reported that green vegetables and fruits were the most commonly increased food items during pregnancy among their participants. *Thirdly*, **Eren N et.al (2015)** who had conducted a study titled “evaluation of dietary habits during pregnancy in **Ankara, Turkey**”. They found that 51% of their participants had increased fruits and vegetables during pregnancy.

This agreement may be explained by the fact that green leafy vegetables and fruits are rich in vitamins and minerals that are important for pregnant women. It also may be due to the fact that most subjects in the current study had assumed that fresh fruits and vegetables improve some gastrointestinal functions and decrease heart burn.

The current study revealed that 64% of its subjects had increased their intake of milk during pregnancy aiming to improve digestion and increase calcium level. This result is consistent with results of two other studies: *Firstly*, **Balogun O et al (2019)** who had conducted study titled “Assessment of knowledge and attitude towards adequate diet practices of pregnant women attending ante-natal clinic at University College and adeoyo maternity hospital, Oyo state, **Nigeria**”. Their results had indicated that 76.2% of their respondents daily consume dairy products (milk) during pregnancy. *Secondly*, **NyaruhuchaCN(2009)** who did study titled “food cravings, aversions and pica among pregnant women in Dar es Salam, **Tanzania**” this study reported that one-half (50%) of its respondents had consumed milk 2-3 times per week. This agreement may be attributed to the fact that milk provides some essential nutrients in well balanced amounts and in easily assimilated forms particularly calcium that is needed for mother and her fetus.

The current study revealed that all of the study subjects had either omitted or decreased caffeinated beverages (tea, coffee and cola) intake during pregnancy. This finding is in line with the findings of a previously mentioned study done by **Forbes L.E et.al (2018)**. They had reported that the majority (80.2%, 54.9%) of their participants had either omitted or decreased caffeinated beverages during pregnancy, respectively. This agreement may be explained by the belief that these beverages can cause some gastrointestinal disorders, anemia and osteoporosis. According to relevant literature, consumption of caffeinated beverages during pregnancy may increase risk for abnormal motor activity and motor development of the fetus and high levels of coffee consumption during pregnancy have been linked to fetal death after the second trimester. Some Studies suggested an increased risk of growth restriction, cardiovascular abnormalities, and skeletal abnormalities in children of women with high caffeine intake during pregnancy. **Loomans, E.M.et.al.....(2012)**

However, the same finding is inconsistent with the results of **Santiago S et.al (2013)** who had investigated “Consumption habits of pregnant women and implications for developmental biology in California”. They had reported that the majority of their participants (80.1%) had consumed caffeinated beverages during their pregnancies. where Cola was the most popular caffeinated beverage (60.2%), followed by coffee (45.5%) and tea (29.8%).

This inconsistency may be attributed to the fact that their subjects had believed that caffeinated beverages provides energy and make them very alert. They followed **the American College of Obstetricians Gynecologists (ACOG 2010)** statement that “moderate amounts of caffeine during pregnancy less than 200 mg per day are not linked to an increased risk of miscarriage or preterm birth”.

The current study revealed that slightly more than one-half (54.3%) of its subjects had omitted salty and spicy food during pregnancy. they believed that salty and spicy food cause heart burn and increase blood pressure. This finding is incongruent with the results of **El-Qudah J et al (2015)** who had conducted study titled “Evaluation of food consumption in as ample of pregnant women from **Jordan**”. They had indicated that about only 14.6% of their respondents had avoided spicy food during pregnancy. This disagreement between the current and previously mentioned one may be due to different sample size which provides a wider range of variations where current study sample was 320 unlike Jordan study which was 103.

Dietary adequacy:

The current study reported that the majority (64.4%, 98.8%, 87.8%, 82.2%, and 55.9%) of its subjects had inadequate intake of energy, iron, vitamin B1, calcium and zinc, respectively. results of other studies: *firstly*, **Dubois L et al (2017)** who had conducted a study titled “adequacy of nutritional intake from food and supplements of pregnant women in Canada”. They revealed that the highest prevalence of inadequate dietary intake was found for iron, vitamin D, and folate. Specifically, inadequate dietary intakes for iron (97%), vitamin D (96%), and folate (70%). *Secondly*, **Zodpey S et.al (2015)** who had conducted a study titled “assessment of Ante natal care (ANC) utilization, dietary practices and nutritional outcomes in pregnant and recently delivered women in urban slums of Delhi, India”. Their results had indicated that more than one-half (95.5%, 81.5%, 84.3%) of their subjects had inadequate intake of some micronutrients like iron, calcium, zinc, respectively. *Thirdly*, **Steyn N et al (2012)** who had conducted a study titled “The Nutrition Transition and Adequacy of the Diet of Pregnant women in Kenya”. They had reported that 56.7% and 78.2% of their participants had inadequate intake of calcium and zinc, respectively. *Fourthly*, **Abu-saad K et al (2012)** who did study titled “adequacy of usual dietary intake and nutritional status among pregnant women in the context of nutrition transition, Israel”.

They had reported that over 90% of their participants had inadequate intakes of Ca (97%), iron (96%) and folate (97%). *Fifthly*, **Singh M et.al (2009)** who had investigated “Dietary Adequacy of pregnant Women of Four District of Rajasthan, India. They reported that most (74.01%, 85.4%, 50.27%) of their participants had inadequate intake of energy, protein and iron, respectively.

This agreement between the results of the current study and the previously mentioned ones may be attributed to the use of the same scale to assess dietary intake (the 24-hour dietary recall) beside its analysis through Food Composition to calculate nutrient intake.

The same finding is inconsistent with the results of **Chotboon Chetal (2018)** who had investigated “Adequacy of calcium intake during pregnancy in a tertiary care center. **Thailand**”. They had reported that as much as 74.9% of their participants had adequate intake of calcium. The discrepancy between the current study and previously mentioned one may be explained by the fact that in spite of the current study subject’s consumption of milk, yet they had inadequate intake of calcium and this may be attributed to some other risk factors. Specifically, the majority of them were multigravida with very close spacing between pregnancies and also may have any medical disorders that prevent absorption of calcium. While adequate intake of calcium among Thailand studied subjects may be explained by the fact that the majority of their subjects had milk daily.

Relationship between nutritional knowledge and dietary adequacy:

The current study revealed that the presence of a statistically significant correlation between subject’s level of knowledge about nutrition and their dietary adequacy during pregnancy. This finding is congruent with results of two other studies: *Firstly*, **Alkerwi A et al(2015)** who had conducted a study titled “Association between Nutritional Awareness and Diet Quality in **South Africa**”. They revealed that nutritional awareness is positively associated with food diversity and adequacy in meeting national recommendations. *Secondly*, **Spronk I et al (2014)** who had conducted a study titled “relationship between nutritional knowledge and dietary intake, in **Australia**”. They had reported a significant, positive ($r < 0.5$) associations between higher nutrition knowledge and dietary intake (adequacy).

This congruency between the present study result-in this respect - and the above-mentioned ones is self-explainable by the fact that Nutritional knowledge definitely reflects on the quality of food intake and also healthy choices of purchased food.

Where advancement of individual nutrition knowledge provides new information, which may stimulate changing of attitude and subsequently result in enhancement of dietary practices. **Mugyia, A.S.N., Tanya, A.N.K., Njotang, P.N., & Ndombo, P.K. (2016).**

5. Conclusion

Based on the findings of the present study, it could be concluded that the majority of the study subjects had fair level of knowledge about nutrition during pregnancy. Almost two-thirds of them had inadequate intake of most nutrients according to recommended dietary allowance (RDA) for pregnant women. Their level of knowledge about nutrition during pregnancy was positively correlated with their dietary adequacy.

Recommendations

Based on the findings of the present study, the following recommendations are suggested:

- Continuous monitoring of pregnant women's nutritional knowledge during each ante-natal visit.
- Screening for nutritional problems and gearing health education toward its correction.
- Upgrading ante-natal nurse's knowledge and skills about nutrition during pregnancy through in-service training and workshops.

For further researches

- Replication of the same study in different Egyptian zones especially rural and urban ones to compare the present study findings.

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