

ASSESSMENT OF NUTRITIONAL STATUS AND HEALTH FOR PREGNANT WOMEN IN SAUDI ARABIA.

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ABSTRACT

Nutrition before and during pregnancy plays extremely important role in ensuring maternal and infant health. Information on the nutritional status of pregnant women in Saudi is still limited. Therefore the present study was carried out to assess the nutritional status of pregnant women, and to investigate their food habits. A systematic random sample of 80 pregnant women were chosen from maternity hospital in (AL-Madina Al-Munawara) city. Socio-economics status, 24 hr dietary recall, food habits, information about risk factors and anthropometric measurements were obtained. This study revealed pronounced deficiencies in energy during pregnancy at 1st and 3rd trimesters and zinc for pregnant women at different pregnancy periods. There was some different positive significant correlations between intake of some nutrients on one side and many health factors as the hemoglobin level frequency of abortions and disease for pregnant women during second trimester as well as anthropometric measurements during third trimester. The results arrived at suggest to consider variety of the diet and increase intake of zinc (to avoid zinc deficiency) as well as the balance of diets in the meal. Moreover nutrition education is recommended for improving nutrition and health status of pregnant women and their infants.

INTRODUCTION

The nutritional status before and during pregnancy is an important factor in ensuring maternal and infant health (Blades, 1998). Nutrition during pregnancy has become an integral component of prenatal care (Luke, 1994). Good nutritional status of women in the reproductive age before and during pregnancy is, therefore of vital importance in the outcome of successive pregnancies. (Morgan, 1994).

The relationship between diet and health during pregnancy, together with patterns of food choice and etiology are chief determinants in terms of the family welfare (Knox *et al.*, 1991 a-). Nevertheless, food cravings and food aversions are common during pregnancy (Bayley *et al.*, 2002).

The most common aversions are towards nonalcoholic caffeinated beverages, meat, fish, poultry and eggs (Flaxman and Sherman, 2000). Food at times of increased nutrient requirements, and differences in cravings between populations are attributed to cultural, geographic and biological factors. In this concern the role of changes in olfactory seems to have great influence during pregnancy (Schenker, 2001).

During pregnancy, the recommended intakes (RDA, 1989) of all nutrients except vitamins A and Vit.k, are increased for women 25 to 50 years

of age. The recommenced energy intake at the first trimester is the same as the recommended per pregnancy intake, whereas a proximately 300 Kcal more per/day are needed during the second and third trimesters. These extra kcal, support weight gain in the mother and fetus. The RDA for protein increases by 10 grams from beginning of the gestational period until delivery (Marcy, 1998).

The need to increase intake during pregnancy is discussed with reference to USA recommended guidelines. For Ca, the intake during pregnancy is recommended to be 1200 mg per/day (Anon, 1996).

Pregnancy is characterized by episodes of nausea and vomiting (Whitehead *et al.*, 1992). Serious medical problems in pregnancy include hypertension, diabetes mellitus, thrombolytic disorders, asthma, thyroid disease, seizure disorder, infections, systemic lupus erythromatosus hematologic disorder, cardiac disease and gastrointestinal disorders (Thacker, 1999).

This research was carried out to assess the nutritional status of pregnant women, investigate the food habits at pregnancy and record risk factors occurring for these women in the in Kingdom of Saudi Arabia.

MATERIALS AND METHODS

Materials:

A systematic random sample of (80) pregnant women in different periods were chosen from maternity Hospital in AL-Madina AL-Munawara, Kingdom of Saudi Arabia.

Methods:

Several parameters were measured and recorded for all pregnant including information about socioeconomic status, information about risk factors occurring during pregnancy using a special questionnaire, in addition to the anthropometric measurements including weight and height. The method used was according to Jelliffe. (1966). Body Mass Index (BMI) obtained by calculating weight in kg. / square of height (meters) (Garrow, 1990).

Daily nutrient intakes were obtained for seven different days and the nutritional values of the consumed food items were calculated using the food composition tables. The adequacy of diets were evaluated with regard to Recommend Dietary Allowance (RDA, 1989).

Blood samples were collected from subjects using disposable plastic syringe. Heparin was added to blood for hemoglobin determination (Hb).

Hemoglobin was estimated by cyano-methoglobin method according to Drabkin, (1949).

Statistical analysis has been achieved by using SPSS program (SPSS, 1995).

RESULTS AND DISCUSSION

Table (1) shows the frequency distribution of studied pregnant women according to trimester. It could be noted that the majority of pregnant women classified in third trimester group which was higher than of the first and second trimesters.

Table (1): Frequency Distribution of Pregnancy According to Trimester.

Pregnant period	Sample	Size
	No	%
First trimester	17	21.25
Second trimester	21	26.25
Third trimester	42	52.5
Total	80	100

1- Anthropometric Measurements:

Table (2) demonstrates the mean and SD. of age, anthropometric measurements and hemoglobin for pregnant women in different pregnancy periods. Results revealed that mean age of pregnant women was (28±7.5, 28.4±7.7 and 31±6.4) years in 1st, 2nd and 3rd trimester respectively, which agreed with the findings of Lukyanova *et al.*, (2000). While mean body weight for pregnant women in different periods were (72±21, 67±15.4 and 71±20 kg) respectively. Concerning mean body mass index (BMI) values were (32.6±9.7, 35.5±7.5 and 36.6±8.5 kg/m²) for women at different periods of pregnancy respectively.

Table (2): Comparison between Mean ± SD. of age, weight, height, BMI and hemoglobin for pregnant women at different periods.

Pregnancy Parameters	First trimester (N=17)		Second trimester (N= 21)		Third trimester (N= 42)		Total (N= 80)	
	Mean	± SD	Mean	± SD	Mean	± SD	Mean	± SD
Age (years)	28	7.5	28.4	7.7	31	6.4	29.8	7
Weight (Kg)	72	21	67	15.4	71	20	70.3	19
Height (cm)	156	14	157	11.3	154	11.6	155.6	12
BMI (Kg/m) ²	32.6	9.6	35.5	7.5	36.6	8.5	35.3	8.5
Hemoglobin (g/100 ml)	11.2	1.3	11.4	1.2	11.7	1.2	11.5	1.2

It is noticed that the mean (BMI) for pregnant women during the first trimester was lower than that (BMI) the pregnant women during second and third trimester.

The results of mean body mass index (BMI) for pregnant women (Table 2) indicate at risk women being obese before pregnancy. Such conclusion agreed with that of (Tracy *et al.*, 2001) who found that women, obese before pregnancy e.g. at conception (BMI > 29) were at greater risk for gestational diabetes, hypertension, operative delivery, large for gestational age infants, and perinatal morbidity.

The mean (Hb) during 1st, 2nd and 3rd trimesters were (11.2 ±1.3, 11.4±1.2 and 11.7±1.2 g/100 ml) respectively; it is noticed that the mean (Hb) for pregnant women at different periods was moderate (Table 2).

2- Biodemographic status:

Data of Table (3) indicated the biodemographic status of pregnant women in different periods. It is found that the majority of pregnant women in 1st, 2nd and 3rd trimester classified in the age group > 25 years old (58.8%, 57.1% and 81.0%) during the 1st, 2nd and 3rd trimesters respectively. While for the age group < 25 years old percentages were (41.2, 42.9 % and 19%) respectively. As for educational status it is worthy to notice that, the majority of pregnant women in first trimester were (preparatory and secondary school)

level (29.4% and 23.5% respectively), but the majority of pregnant women in second trimester were (secondary school and college) level (28.6% for both), nevertheless the majority of pregnant women in third trimester were highly educated (college) level (38.1%)

Table (3): Biodemographic Status of Pregnant Women in Different Periods:

Period Variables	First Trimester (N=17)		Second trimester (N=21)		Third trimester N=42	
	No	%	No	%	No	%
Age (years)						
a) <25	7	41.2	9	42.9	8	19.0
b) >25	10	58.8	12	57.1	34	81.0
Education levels						
a) Illiterate	3	17.6	4	19	9	21.4
b) Read & Write					2	4.8
c) Primary	2	11.8			1	2.4
d) Preparatory	5	29.5	5	23.8	9	21.4
e) Secondary	4	23.5	6	28.6	5	11.9
f) College	3	17.6	6	28.6	16	38.1
Occupation						
a) Working	2	11.8	4	19.0	5	11.9
b) Non- Working	15	88.2	17	81.0	37	88.1
Frequency of Pregnancies						
a) < 5	10	58.8	10	47.6	21	50.0
b) ≥ 5	7	41.1	11	52.4	21	50.0
Frequency of Abortions						
a) None	9	52.9	7	33.3	23	54.8
b) Low < 2	4	23.5	11	52.4	16	38.1
c) High < 5	4	23.5	3	14.3	3	7.1
Hemoglobin level g/dl						
a) Low < 10	7	41.2	4	19.0	11	26.2
b) Moderate < 12	8	47.1	15	71.4	26	61.9
c) High < 14	2	11.8	2	9.2	5	11.9

The majority of pregnant women in 1st, 2nd and 3rd trimesters were housewives (88.2%, 81.0% and 88.1%) respectively.

Regarding frequency of pregnancies cases women could be classified in the group <5 (58.8%, 47.6% and 50.0%) during the 1st, 2nd and 3rd trimester respectively, while the pregnancies frequency group >5 showed (41.1%, 52.4% and 50.0%) respectively. The results revealed that for frequency of abortions in 1st and 3rd trimester the high percentage non abortions had (52.9% and 54.8%) respectively, while for low abortions (<2) higher percentage at 2nd trimester and in case of high abortions (<5) percentage was higher in first trimester. As for (Hb, g/100ml) level it is worthy to notice that the majority of women in different pregnancy periods were of moderate (<12) level (47.1%, 71.4% and 61.9%) in 1st, 2nd 3rd trimester respectively.

3- Problems occurring during pregnancy:

Table (4) demonstrated some problems occurring during pregnancy at 1st, 2nd and 3rd trimesters. The highest percentage for pregnant women in 1st, 2nd and 3rd trimester were none problems (23.5% 38.1% and 31.0% respectively). The majority of women with varicose veins, nausea & vomiting,

Table (4): Some Problems Occurring During Pregnancy:

Period Risk Factors	First Trimester (N=17)		Second trimester (N=21)		Third trimester (N=42)	
	No	%	No	%	No	%
Nausea & Vomiting	2	11.8	1	4.8	1	2.4
Heartburn	1	5.9			1	2.4
Edema	2	11.8	1	4.8	1	2.4
Diabetes mellitus					1	2.4
Anemia			1	4.8	6	14.3
Hypertension			2	9.5	1	2.4
Urinary tract infection with pregnancy			1	4.8		
Varicose veins	3	17.6			1	2.4
Diabetes & Anemia	2	11.8	5	23.8	16	38.1
Diabetes & Hypertension	3	17.6	1	4.8		
Diabetes & varicose					1	2.4
Hypertension & Anemia			1	4.8		
None	4	23.5	8	38.1	13	31.0

heartburn, edema and diabetes with hypertension were found at the 1st trimester. Nausea & vomiting or morning sickness, edema and diabetes with anemia cases showed each (11.8% in the 1st trimester), while the less percentage for problems occurring during pregnancy in first trimester was heartburn (5.9%). These results agrees with that of El-Agroudy, (1994) who found morning sickness among pregnant women 16.1% while these results disagreed with that of Bayley *et al.*, (2002) who found nausea & vomiting or morning sickness amounted to 80% of the cases. And disagreed with the findings of Shaheen and Header (2000). Morning sickness is common problem associated with pregnancy especially in the first trimester (Jim and Stewart, 1998). The best dietary advice seems to be eat small to avoid vomiting of pregnancy and omit foods that contain teratogenic and abortifacient chemicals (Hook, 1980 and Profet, 1995). The highest percentage problems occurring for pregnant women in 2nd trimester were diabetes with anemia (23.8%) and hypertension (9.5%), while the same levels were recorded for nausea & vomiting, edema, anemia, urinary tract infection, diabetes with hypertension and hypertension with anemia (4.8%). These results agreed with that of Shaheen and Header (2000) who found that the distribution of hypertension of pregnant women was (9.8%).

The common problems occurring during pregnant in 3rd trimester were diabetes with anemia (38.1%) and anemia (14.3%), while the same results were recorded for nausea & vomiting, heartburn, edema, diabetes mellitus, hypertension, varicose veins and diabetes with varicose veins (2.4%). Anemia is common during for pregnant at third trimester where women were at risk of iron deficiency anemia (Ohri and Swindale, 2000). These results agreed with Whitehead *et al.*, (1992) who reported morning sickness to be the common term for these symptoms, is misleading since less than a third of women who experienced nausea during 3rd trimester of pregnancy reporting such symptoms as solely problem in the morning.

4- Food Habits:

Table (5) summarizes food behavior for pregnant women in different periods. The majority of pregnant women intake of milk and milk products at ≤ 2 per day level was during the third trimester. Also the high percentage to eat fish ≤ 2 per week especially during 2nd trimester, these results agreed with (Odent *et al.*, 2002) who encouraged pregnant women to eat fish which did not show any side effect. The high percentage not eating liver was during 2nd and 3rd trimesters, but the high percentage eating liver ≤ 2 per week was during 1st trimester. The Swedish National Food has recommended pregnant women to restrict their intake of liver or preferably avoid consumption of liver (Ilbaeck *et al.*, 1991).

Table (5): Food Behavior for Pregnant Women in Different Period.

Period Variables	First Trimester (N=17)		Second trimester (N=21)		Third trimester (N=42)	
	No	%	No	%	No	%
1- Milk& Milk products						
a) ≤ 2 per day	12	70.6	13	61.9	34	81.0
b) ≤ 4 per day	5	29.4	8	38.1	8	19.0
2- Fish intake						
a) None	9	52.9	5	23.8	14	33.3
b) ≤ 2 per week	8	47.1	16	76.2	27	64.3
c) 4 per week					1	2.4
3- liver						
a) None	6	35.3	11	52.4	22	52.4
b) ≤ 2 per weeks	9	52.9	8	38.1	19	45.2
c) ≤ 4 per weeks	2	11.8	2	9.5	1	2.4
4- Meat						
a) ≤ 2 per weeks	11	64.7	18	85.7	35	83.3
b) ≤ 4 per weeks	6	35.3	3	14.3	7	16.7
5- Poultry						
a) ≤ 2 per week	8	47.1	12	57.1	26	61.9
b) ≤ 4 per week	9	52.9	9	42.9	16	38.1
6- Eggs						
a) ≤ 2 per weeks	13	76.5	20	95.2	39	92.9
b) ≤ 4 per weeks	4	23.5	1	4.8	3	7.1
7- Legumes						
a) None	1	5.9	2	9.5	4	9.5
a) ≤ 2 per weeks	15	88.2	16	76.2	30	71.4
b) ≤ 4 per weeks	1	5.9	3	14.3	8	19.0
8- Cereals & Products						
a) ≤ 2 per day	5	29.4	3	14.3	1	2.4
b) ≤ 4 per day	11	64.7	18	85.7	28	66.7
c) ≤ 5 per day	1	5.9			13	31.0
9- Oil & Fats						
a) ≤ 2 per day	15	88.2	21	100	34	81.0
b) ≤ 4 per day	2	11.8			8	19.0
10- Fresh vegetables						
a) ≤ 2 per day	10	58.8	9	42.9	19	54.2
b) ≤ 4 per day	7	41.2	12	57.1	23	54.8

Moreover the pregnant women in 1st, 2nd and 3rd trimester consumed all foods such as meat, eggs, legumes ≤ 2 per week, cooked vegetables ≥ 4 per week, cereals and products < 4 per day, oils & fat and fruits ≤ 2 per day, while the high percentage to eat poultry ≤ 2 per week during 2nd and 3rd trimester. Also the high percentage to eat fresh vegetables ≤ 2 per day during 1st Trimester and to eat fresh vegetables ≤ 4 per day during 2nd and 3rd trimesters.

Also, from the results of Table (5) it is noticed the high percentage of women during different periods of pregnancy was drinking fresh fruit juices and eating ≤ 3 meals per day. These results agreed with finding (AL-Kanhal and Bani, 1995).

5- Mean Daily Nutrients intake:

Data of Tables (6 and 7) show the mean daily nutrients intake for pregnant women in different periods compared to RDA (1989). Mean macro nutrient intakes for pregnant women in 1st and 3rd trimester were less than 100% except of total protein and carbohydrates in 2nd and 3rd trimesters. Mean energy intakes were (2284 \pm 550, and 2320 \pm 497 Kcal /d) (91.3%, and 92.8%) of RDA respectively, for the pregnant women during 1st and 3rd trimesters which coincided with the results (Houshiar *et al.*, 1999).

Minerals and vitamins intake of pregnant women in 1st and 3rd trimesters were higher than 100% of RDA except for zinc (about trimesters), calcium (1st trimester) and Vit.A (3rd trimester). Mean calcium intake were (1168.6 \pm 471.2, 1236.6 \pm 376 and 1234.8 \pm 499mg/d) being (97.3%, 103% and 102.9%) of RDA respectively, for pregnant women during 1st 2nd and 3rd trimester. It is noticed that the mean calcium intake for pregnant women during 1st trimester was less than mean calcium intake (% of RDA) for pregnant women during 2nd and 3rd trimester. Therefore there is a need to increase Ca intake during 1st trimester of pregnancy according to USA recommended guidelines for Ca intake during pregnancy (1200 mg/d) (Anon, 1996). While the mean Zinc intake were (6.5 \pm 1.9, 6.1 \pm 2&7.7 \pm 2.9) which were 43.3%, 40.6% and 51.3% of RDA, respectively for pregnant women during 1st, 2nd and 3rd trimester; it could be noticed that zinc intake deficiency was evident for all the pregnant in different periods. These results agreed with the findings of Fitzgerald *et al.*, (1993), Ortega *et al.*, (1997) and Subadra (2001). Diets are at risk of Zn deficiency; Zn requirements for foetal growth and maternal tissue assertion are high (Huddle *et al.*, 1998). Mean Vit.A intakes were (811.8 \pm 462.7, 810.9 \pm 448 and 780.7) (101.3%, 101.2% and 97.5% of RDA) respectively for pregnant women during 1st 2nd and 3rd trimester. It could be noticed that the mean Vit.A intake during 3rd trimester was lower than mean Vit.A intake during 1st and 2nd trimesters of pregnancy.

Distribution of calories among energy sources (Table 8) seem to be acceptable, with small rise of protein calories.

Table (6): Comparison Between Mean \pm SD Macro- Nutrients Intake for Pregnant Women in Different Periods Compared to (RDA).

Pregnancy Parameters	First trimester (N=17)			Second trimester (N= 21)			Third trimester (N= 42)			Total (N= 80)		
	Mean	\pm SD	%RDA	Mean	\pm SD	%RDA	Mean	\pm SD	%RDA	Mean	\pm SD	%RDA
Calories (Kcal)	2284	550	91.3%	2529	402	101.2%	2320	497	92.8%	2377	480	95.8%
Total protein (g)	109.8	35.6	181.6%	115.2	31.8	192%	101.2	27.6	168.65	106.7	30.8	177.8%
Protein – A (g)	75.7	25.1		76.8	22.2		60.9	22.2		68.2	23.9	
Protein – P (g)	34	13.2		38.3	13.6		40.5	16.04		38.5	14.9	
Total fat (g)	63.7	33.7	74.9%	69.8	29.8	82.1%	58	23.06	68.2%	62.3	27.5	73.2%
Fat – A (g)	45.5	16.8		47.3	16.5		35.5	13.7		40.7	16	
Fat – P (g)	18.2	20.8		22.	18.4		22.6	12.9		21.5	16.2	
Carbohydrate (g)	317.9	92.4	99.7%	360	92.5	112.9%	348.4	83.7	109.1%	345	88.	108.2%

RDA: Recommended Dietary Allowances (1989).

A: Animal.

P: Vegetable

Table (7): Comparison Between Mean & SD Macro- Nutrients Intake for Pregnant Women in Different Period Compared to (RDA).

Pregnancy Micro- Nutrient	First trimester (N=17)			Second trimester (N= 21)			Third trimester (N= 42)			Total (N= 80)		
	Mean	± SD	%RDA	Mean	±SD	%RDA	Mean	±SD	%RDA	Mean	±SD	%RDA
1- Minerals												
Calcium (mg)	1168.6	471.2	97.3%	1236.6	376	103%	1234.8	499.1	102.9%	1221.2	461.2	101.7%
Phosphorus (mg)	1507.8	448.3	125.6%	1449	327.6	120.7%	1473.3	471.1	122.7%	1474.2	428.3	122.8%
Sodium (mg)	263	173.9		445.2	439.8		421.8	300.5		394.2	326.7	
Potassium (mg)	1456.9	590.8		1418.3	596.3		1297.7	617.9		1363.2	603.2	
Total Iron (mg)	46.4	47.4	154.6%	44	12.5	146.6%	33.4	9.5	111.3%	38.9	24	129.6%
Animal Iron (mg)	17.9	10.2		22.2	6.2		18.4	6.3		19.3	7.4	
Plant Iron (mg)	16	11.2		21.1	8.5		15.5	5.8		17.1	8.2	
Zinc (mg)	6.5	1.9	43.3%	6.1	2	40.6%	7.7	2.9	51.3%	7.07	2.6	47.1%
2- Vitamin A												
Vitamin A (ug)	811.8	462.7	101.3%	810.9	448.2	101.2%	780.7	390.1	97.5%	795.2	416.49	99.4%
Thiamin (mg)	2.4	1.3	160%	3.9	2.7	260%	2.5	1.2	166.6%	2.8	1.8	186.6%
Riboflavin (mg)	3.7	2.6	231.2%	4.4	2.8	275%	2.8	1.5	175%	3.4	2.28	212.5%
Niacin (mg)	17.6	10.9	103.55%	15.8	7	92.9%	12.6	8.5	74.1%	14.5	8.9	85.7%
Vitamin C (mg)	269.7	183.7	385.2%	235.7	156	336.7%	285.6	144.7	405%	269.1	155.9	384.4%

RDA. Recommend dietary Allowances (1989).

6- Correlation Between Anthropometric Measurements, some parameters And Nutrients Intakes:

From results of Table (9) different correlation coefficients were found between all variables nearly for pregnant women during first trimester. It could be noticed that there was high significant differences among carbohydrate intake and total calories and protein intake for pregnant women during first trimester, and between Vit.A intake and protein intake. Also high significant differences were recorded between Vit.C and iron and Vit.A intakes.

Concerning anthropometric measurements, the height correlated negatively with, protein, fat, carbohydrate, calcium, Vit.A and Vit.C, intakes while weight correlated negatively with protein and Vit.C intakes. Also BMI correlated negatively with calcium, iron, Vit.A and Vit.C intakes, but correlated positively with total calories, protein and fat. Regarding age, it correlated negatively with calcium, Vit.A and Vit.C. As for number of meals, it correlated positively with calories, protein, fat and carbohydrate, but correlated negatively with calcium, iron, Vit.A and Vit.C., while (HB) correlated positively with iron, but correlated negatively with fat. Also frequency of abortions correlated negatively with calories, fat, calcium, iron and Vit.C while disease correlated positively with all nutrients intake except zinc and Vit.C where correlation was negative.

Moreover, the results of Table (10) indicated a relation between nutrients intake and nearly all other variables of pregnant women during second trimester. As for calories, it correlated high significantly positive with protein and carbohydrate, but significantly positive with fat. Also protein correlated high significantly positive with carbohydrate, iron and zinc. While calcium correlated high significantly positive with iron. As for Vit.A, it correlated significantly positive with (HB) and frequency of abortions, while zinc correlated significantly positive with iron. Regarding anthropometric measurements, there were negative correlations between height with fat and iron. As for age, it correlated positively with carbohydrates and negatively with calories, protein and zinc. Also number of meals correlated negatively with calcium, zinc and Vit.A. While disease correlated significant positive with calories and correlated positively with number of meals and frequency of abortions.

Data of Table (11) demonstrates the relationship between nutrients intake and some parameters including anthropometric measurements for pregnant women during third trimester. The results revealed positive high significant differences among calories and protein, carbohydrate, Vit.A Vit.C and iron. While zinc correlated significantly positive with calcium. Vit.A correlated high significantly positive with protein and carbohydrate. Regarding anthropometric measurements there were high significant differences between height and fat, and significantly positive with calories and carbohydrate. While weight correlated significantly positive with protein, carbohydrate and iron. Also, BMI correlated significantly positive with protein and carbohydrate.

Table (8): Mean ± SD for protein and fat, carbohydrate energy ratios for pregnant women in different periods.

Pregnancy Energy derivation	First trimester (N=17)	Second trimester (N= 21)	Third trimester (N= 42)	Total (N= 80)
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Protein Energy Ratio (PER)	19.23 ± 4.4	18.22± 3.2	17.45 ±3.9	18.3 ± 3.8
Fat Energy Ratio (FER)	25.1 ± 11.8	24.84 ± 10.5	22.5 ± 8.1	24.15 ± 9.6
Carbohydrate Energy Ratio (CER)	55.67 ± 14.5	56.94 ± 14.5	60.05± 13.0	57.55 ± 13.7

Table (9): Correlation between Anthropometric Measurements, some Parameters and some of Nutrients Intake for Pregnant Women during First Trimester

Parameters	Calories	Protein	Fat	Carbo- hydrate	Calcium	Iron	Zinc	Vit. A	Vit. C	Height	Weight	BMI	Age	Number of meal	Hemoglobin	Frequency abortion	Disease
Age					-0.007			-0.005	-0.070				1.00				
BMI	0.205	0.177	0.090		-0.326	-0.225		-0.275	-0.310	-0.052		1.00					
Calcium					1.00												
Carbohydrate	0.694**	0.697**		1.00													
Disease	0.358	0.383	0.287	0.109	0.219	0.023	-0.137	0.205	-0.086			-0.080		-0.171		-0.115	1.00
Fat			1.00														
Frequency abortions	-0.121		-0.162		-0.168	-0.234			-0.106							1.00	
Height		-0.225	-0.125	-0.155	-0.476			-0.179	-0.021	1.00							
Hemoglobin			-0.423			0.60						-0.387			1.00		
Iron	0.575*		-0.036		-0.179	1.00											
Number of meals	0.003	0.170	0.102	0.067	-0.221	-0.333		-0.164	-0.101			0.271		1.00			
Protein	0.507*	1.00															
Vit. A	0.544*	0.673**	-0.045	0.551*				1.00									
Vit. C			-0.279			0.675**		0.761**	1.00								
Weight		-0.018							-0.018		1.00						
Zinc					-0.008	-0.087	1.00										

* P<0.05

**P<0.01

Table (10): Correlation Between Anthropometric Measurements, some Parameters and some of Nutrients Intake for Pregnant Women during Second Trimester.

Parameters	Calories	Protein	Fat	Carbohydrate	Calcium	Iron	Zinc	Vit. A	Vit. C	Height	Weight	BMI	Age	Number of meals	Hemoglobin	Frequency abortion	Disease
Protein	0.569**	1.00															
Fat	0.506*		1.00														
Carbohydrate	0.625**	0.611**		1.00													
Calcium					1.00												
Iron		0.551**			0.738**	1.00											
Zinc		0.593**				0.504*	1.00										
Vit. A								1.00									
Vit. C									1.00								
Height			-0.293			-0.012				1.00							
Weight											1.00						
BMI										-0.052		1.00					
Age	-0.151	-0.162		0.299			-0.022						1.00				
Number of meals					-0.048		-0.337	-0.163		-0.388		-0.107		1.00			
Hemoglobin							-0.030	0.542*						-0.111	1.00		
Frequency abortions								0.456*				-0.164		-0.008		1.00	
Disease	0.471*	0.209	0.061	0.056	0.132	0.116	-0.287	0.066	0.033					-0.131		-0.269	1.00

* P<0.05

**P<0.01

Table (11): Correlation Between Anthropometric Measurements, some Parameters and some of Nutrients Intake for Pregnant Women during third Trimester.

Parameters	Calories	Protein	Fat	Carbo- hydrate	Calcium	Iron	Zinc	Vit. A	Vit. C	Height	Weight	BMI	Age	Number of meals	Hemoglobin	Frequency abortion	Disease
Protein	0.434**	1.00															
Fat			1.00														
Carbohydrate	0.675**	0.647**	-0.032	1.00													
Calcium	-0.159				1.00												
Iron		0.514**				1.00											
Zinc		-0.140	7-0.014	-0.008	-0.309*		1.00										
Vit. A	0.451**	0.378*		0.335*				1.00									
Vit. C	0.566**		*0.098	0.468**	0.077			0.405**	1.00								
Height	0.375*		0.440**	0.356*	-0.131				-0.006	1.00							
Weight		0.349*		0.356*	-0.066	0.316*		-0.100	-0.006		1.00						
BMI		0.311*	0.271	0.370*			-0.192					1.00					
Age	-0.198	-0.018		-0.147		-0.035	-0.206	-0.217			-0.102		1.00				
Number of meals			0.113	0.084	0.102	-0.115	-0.028	0.113						1.00			
Hemoglobin					-0.210		-0.014	-0.049					-0.216		1.00		
Frequency abortions							0.153								-0.093	1.00	
Disease	-0.181	-0.086	-0.039	-0.107	-0.091	0.006	-0.013	-0.173	-0.069		-0.343*				-0.094	-0.135	1.00

* P<0.05

**P<0.01

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As for age, it correlated negatively with calories, protein, carbohydrate, iron, zinc and Vit.A., while number of meals correlated positively with fat and carbohydrate, but correlated negatively with calcium, iron, zinc and Vit.C. The (Hb) correlated negatively with calcium, zinc and Vit.A. Also frequencies of abortions correlated positively with zinc. While disease correlated negatively with all nutrients except correlated positively with calcium and iron.

RECOMMENDATIONS

A comprehensive program must be planned to improve health and nutrition of pregnant women in Saudi Arabia. This program must include two components.

1. Health and nutrition education with stress on :
 - Proper health and nutritional facts.
 - KAP change of unprepared items.
 - Importance of regular and periodic check up and proper utilization of health care units.
 - Comprise all girls in preparatory and secondary age strata and adult females in child bearing age (pre-marital, pre-conception, pre-natal post-natal and inter-pregnancy).
 - Using all methods and channels of education (personal communication, mass media and community participation).
2. Other lines of intervention especially:
 - Improvement of health services offered for women and girls including health units services and outreach services and records.
 - Supplements.
 - Distribution of some valuable and enriched food items especially for poor women.

REFERENCES

- AL-Kanhal, M. A. and I.A. Bani (1995). Food habits during pregnancy among Saudi women, *International Journal for Vitamin and Nutrition Research*, 65 (3): 206-210.
- Anon (1996). New research underscores need for more calcium during pregnancy, *Cheese Reporter*, 120 (15): 12.
- Bayley, T. M.; L. Dye; S. Jones; M., Debone and A. J. Hill (2002). Food cravings and aversions during pregnancy: Relationships with nausea and vomiting, *Appetite*; 38 (1): 4-51.
- Blades-M (1998): Nutrition before and during pregnancy, *Nutrition and Food-Science*, (2/3): 99-101.
- Drabkin, S. D. L. (1949). The Standardization of hemoglobin measurements, *Amr. J. Med. Sci.* 217: 710.
- El- Agroudy, A.A. (1994). Prevalence of pregnancy problems in Minufiya governorate, *Res. Bull. Home Econ. Minufiya Univ.*, 4(1).

- Fitzgerald, S. I.; R. S. Gibson; J. Quan-de-Serrano; L. Portocarrero; A. Vasquez; E. de. Zepeda; C. y. Lopez-Palacios; L. U. Thompson; A. M. Stephen and N. W. Solomons (1993). Trace element intakes and dietary phytate: Zn and Ca phytate: Zn millimolar ratios of periurban women during the third trimester of pregnancy. *American Journal of Clinical Nutrition*, 57 (2): 195-201.
- Flaxman, S.M. and D.W. Sherman (2000). Morning sickness Mechanism for protecting mother and embryo, *Quarterly Review of Biology*, 75: 113-148.
- Garrow, J. (1990): *Obesity; Medicine International Middle Eastern Edition*, 82, Published by the Medicine Group (uk) Ltd., PP. 3382-3386.
- Hook, E.B. (1980): Influence of pregnancy on dietary selection, *International Journal of Obesity*, 4: 338-340.
- Houshiar, R. A.; N. Omidvar; M. Mahmoodi; F. Kolahtooz and M. Amini, (1999). Dietary intake, anthropometry and birth outcome of rural pregnant women in two Iranian districts, *Nutrition Research*, 18(4): 1469-1482.
- Huddle, J. M.; R. S. Gibson and I. R. Cullinan (1998). Is zinc a limiting nutrient in the diets of rural pregnant Malawian women ? *British – Journal of Nutrition*, 79(3): 257-265.
- Ilbaeck, N. G.; L. Busk; B. Halen and S. Slorach (1991). Pregnant women should avoid liver, *Var- Foeda*, 43 (3): 102-108.
- Jelliffe, D.B. (1966). *Assessment of Nutritional Status of Community*, WHO-Monogr. Ser. A. No.5, Geneva.
- Jim, M. and T. Stewart (1998). *Essential of Human Nutrition*, Pub in United States by Oxford University Press, Inc, New York.
- Knox, B.; J. Kremer and J. Peace (1991 a). Food preference during human pregnancy: A review, *Food - Quality and Preference*, 2 (3): 131 -154.
- Luke, B. (1994): *Nutrition during pregnancy*. *Curr Opin Obstet. Gynecol.*, 6 (5): 402-407.
- Lukyanova, O.L.; O.A. Vrzhesinkaya; V.M. Kodentsova; N.A. Beketova and L.A. Kharitonehik (2000). Dependence of vitamin composition of breast milk on polyvitamins intake during pregnancy and lactation, *Voprosy Pitaniya*, 68 (4): 24-26.
- Marcy, F. (1998). *Nutrition for Healthy Living*, WCBI McGRAW –Hill, New York.
- Morgan, J. (1994). Nutrition and pregnancy problems and solutions. *Nurs. Times.*, 90 (46): 31-3.
- Odent, M.; S. Colson and P. de. Reu (2002). Encouraging pregnant women to eat fish did not show effect, *British Medical Journal*, 324 (7348): 1279.
- Ohri, V. P. and A. J. Swindale (2000). Iron in the diets of rural Honduran women and children, *Ecology of Food and Nutrition*, 38 (3): 285-306.
- Ortega, R. M.; P. Andres; R-M. Martinez; A.M. Lopez-Sobaler, and M.E. Quintas (1997). Zinc levels in maternal milk: The influence of nutritional status with respect to zinc during the third trimester of pregnancy. *Eur. J. Clin. Nutr.*; 51(4): 253-258.
- Profet, M. (1995). *Protecting Your Baby To - Be: preventing birth Defects in the First Trimester*, New York, Addison- Wesley Publishing.

- RDA (1989). Recommended Dietary Allowances, 10th Ed., Food Nutrition Board, National Academy of Sciences Press, USA.
- Schenker, S. (2001): Gruesome gourmets, Nutrition Bulletin, 26(1): 11-12.
- Shaheen, K.A. and E.A. Header (2000)., Some factors component with pregnancy and lactation period and their relationship with nutritional status, 5th Egyptian Conference of Home Econ. Minufiya Univ Faculty of Home Econ. 16-17.
- SPSS (1995). "SPSS-PC for the IBM" PC/X. Volume2. SPSS INC. Monogr. Ser. A. No.53 Geneva.
- Subadra, S. (2001). Prevalence of micronutrient deficiency particularly of iron, zinc and folic acid in pregnant women in south east Asia, British. J. Nutrition, 85: S87-S92.
- Thacker, H.L. (1999). Medical aspects of pergnancy J, Women Health, 8 (3): 335- 46.
- Tracy S. H.; Anna Maria Siega- Riz; J. H. Calvin; A. Chandra and S. Christine Dunkel (2001). Prolonged periods without food intake during pregnancy increases risk for elevated maternal corticotropin - releasing hormone concentrations. Am. J. Obstet Gynecol, 185: 403- 412.
- Whitehead, S.A.; P.L.R. Andrews and G.V.P. Chamberlain (1992). Characterisation of nausea and vomiting in early pregnancy: A survey of 1000 women, J. Obstetrics and Gynaecology, 12: 364-369.

تقييم الحالة الغذائية والصحية للسيدات الحوامل بالمملكة العربية السعودية

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تلعب التغذية دورا مهما لدي الأم قبل وأثناء الحمل وعلى صحة الأطفال والمعلومات الغذائية عن السيدات الحوامل مازالت محدودة في المملكة العربية السعودية ، ولهذا تم إجراء دراسة تقييم الحالة الغذائية والصحية للسيدات الحوامل وتم اختيار عينة عشوائية قوامها (٨٠) من السيدات المترددات على مستشفى النساء والولادة بالمدينة المنورة وتم الحصول على المعلومات الخاصة بالحالة الاجتماعية والاقتصادية والنمط الغذائي عن طريق استبيانته خاصة وعن طريق المقابلة الشخصية أما المعلومات الغذائية فأخذت بواسطة استمارة استرجاع غذاء ٢٤ ساعة لمدة أسبوع . وتم التحليل الغذائي والإحصائي .

وأوضحت النتائج وجود قصور في المأخوذ من الطاقة في شهور الحمل الأولى والأخيرة والزنك في جميع مراحل الحمل وأيضا وجود ارتباطات إحصائية معنوية بين المأخوذ من بعض العناصر الغذائية والهيموجلوبين وعدد مرات الإجهاض والإصابة بالأمراض لدي السيدات الحوامل في الشهور الثلاثة الثانية من الحمل. بينما وجدت ارتباطات إحصائية معنوية بين المأخوذ من العناصر الغذائية والمقاييس الجسمية لدي السيدات الحوامل خلال الشهور الثلاثة الأخيرة من الحمل . وعلى ضوء ذلك توصي الدراسة بالاهتمام بتنوع الطعام وزيادة المتناول من الزنك لتجنب نقص الزنك الشديد لما له من أهمية في نمو الجنين ومراعاة التوازن في الوجبة الغذائية لتفي بالاحتياجات الغذائية مع عمل برامج توعية غذائية للسيدات قبل وأثناء الحمل لتحسين الحالة الغذائية والصحية لديهم مما يعود عليهن وعلى أطفالهن بالصحة الجيدة .