

## Evaluation of Food Consumption in A Sample of Pregnant Women from Jordan

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### ABSTRACT

The aim of this study was to evaluate the food and nutrient intake of Jordanian women and compare the intake with the Dietary Reference Intakes (DRIs) (IOM,2011) . A convenience sample of 103 pregnant women (18–40 years old) was selected from three different rural villages of the Al-Balqa' district of Jordan. Data were collected using the developed and validated self-report Questionnaire .The most frequent source of nutritional advice for pregnant women was medical staff followed by mother and other family members (47.6% and 30.1%, respectively). More than 50% of the respondents reported that they did not eat breakfast, with lack of appetite given as the main cause. The average daily consumption of protein, carbohydrate and fat of pregnant women was 65.2g , 272.6g and 55.9g , respectively. The mean daily intakes obtained by the mothers were lower than references for protein, vitamin A, vitamin D, vitamin K, folic acid and calcium .Mean daily intakes of vitamin E, zinc and magnesium were in excess of the recommended values of the standards . Special educational programs are strongly recommended for pregnant women and integrated strategies should be considered to promote increased intakes to meet nutrient recommendations.

**Keywords:** Pregnancy , Food Consumption , Jordan.

### INTRODUCTION

Pregnancy is a vital stage in a woman's life as it brings numerous physical, emotional and hormonal changes.

Adequate food intake is essential during all trimesters of pregnancy (Gharaibeh *et al*, 2005) . Pregnant women have been widely recognized as a vulnerable group from a health point of view ( Amarin *et al*, 2010 ). Considerable attention should be paid to the dietary intake and nutritional status of pregnant women. A woman's normal nutritional requirements increase during pregnancy to meet the needs of the growing fetus and of the maternal tissues associated with pregnancy (Abu-Moghli *et al*, 2012). Proper dietary balance is necessary to ensure sufficient energy intake for adequate growth of the fetus without drawing on the mother's own tissues to maintain her pregnancy (Mridula *et al*, 2003).

Adequate intakes of vitamins and minerals are fundamental to fetal health and development ( Allen, 2005) . An insufficient supply of micronutrients can result in a state of biological competition between the

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mother and conceptus, which may subsequently affect the health status of the mother and child ( King, 2003). Micronutrient deficiencies may result in poor pregnancy outcomes, including intrauterine growth retardation (Fall *et al*, 2003), impaired postnatal growth and immune function and an increased risk of diseases in adulthood, such as cardiovascular disease and type 2 diabetes (Derbyshire *et al*, 2009).

Even though maternal and child health centers in the Ministry of Health are well distributed in Jordan, only 29.1% of women in Al-Balqa' Directorate use prenatal care, while 23.9% use postnatal care services (Ministry of Health, Jordan 2008) .In Jordan there are few studies that have reported dietary intake in pregnant women (Jarrah *et al*. 2007, Amarin *et al*. 2010 , Al-Kuran *et al*. 2011, Abu-Baker and Savage 2011 , Salahat and Ibrahim, 2012) ,especially from rural areas (Al-Mehaisen *et al*. 2011 , Abu-Moghli *et al*. 2012 , Abu-Moghli *et al*. 2012 ). Thus, this study aimed to assess the food and nutrient intake of pregnant women from three different rural villages of the Al-Balqa' district of Jordan and to compare maternal nutrient intakes to the DRIs (IOM, 2011) . The findings from this research could be used to guide public health promotion programs .

#### **METHODOLOGY**

This cross-sectional study was carried out among pregnant women in different trimesters of pregnancy who were visiting primary health care centers in three rural villages in the Al-Balqa' for routine antenatal care. A sample of 103 pregnant women was conveniently selected . The survey was conducted from March to May 2009. All women agreed to participate in the study . and all of them . Approval to implement the study protocol was obtained from the Committee of Scientific Research of Al-Balqa' Applied University.

Subjects included in the present study were 18–40 years, non-smokers and not taking medications

known to influence the appetite. Participants' food intake data were collected through face-to-face interview using a structured questionnaire, which was prepared by the researchers according to literature review and filled in by the researchers. The questionnaire consists of socio-demographic data (age, educational level, family size, interval between pregnancies) and items regarding eating habits. Dietary intake data of nutrients were evaluated by means of a 3-day food record (Brustad *et al*, 2003) . On the day of the interview (first day), the questioner was filled out by the participants. The other two days (including a one weekend day), women were asked to complete and return the food record later to the health center on their next visit, then they were returned to the researchers.

All of the participants were instructed on how to estimate their daily dietary intake.

All nutrient intakes reported here were dietary intakes without considering the nutrient supplementation. Food quantities were calculated using household measurements (plate, glass, slice, spoon, etc.) . Individual's records were reviewed and the nutrient calculations were carried out using the USDA food composition tables (USDA National Nutrient Database for Standard Reference, 2002) , as well as Food Composition Tables for use in the Middle East ( Pellett and Shadarevian 1970) and Food Composition Tables for Kingdom of Bahrain ( Musaiger, 2011) . Some information related to the content of Jordanian food was calculated based on the information found on local food labels.

The average daily intakes of individual nutrient items were summed to compute the total intake from each nutrient. DRIs for pregnant women were utilized to assess the adequacy of nutrient intake, including acceptable macronutrient distribution range (AMDR); estimated average requirement (EAR); recommended dietary allowance (RDA) and adequate intake (AI) (IOM,2011). Statistical analyses was performed using

SPSS, version 15.0 and data were presented as means, standard deviations (SD) , frequencies and percentages.

## RESULTS

The average family size in the study sample was 4.1 (range 2–13), and the mean interval between pregnancies was 2.6 years (range 1–8) with a mean of previous pregnancies of 2.1 (range 0–11). the average age of the sample was 26.9±6.1years .

Table 1 summarizes the background sociodemographic characteristics of the subjects. About half of women (54.3%) had educational level higher than high school and only 23.3% were employed. The most frequent source of nutritional advice for pregnant women was medical staff followed by mother and other family members (47.6% and 30.1%, respectively). Of the sample, 23.3% reported not eating breakfast and 30.1% reported rarely eating this meal because of a lack

of appetite and time. The Intake of supplements during pregnancy was common among the sample.

Onions and radishes were avoided by only 10.7% of respondents and spices by 14.6% (Table 2). The majority of the sample did not give any particular reason for their avoidance of these food items. Of the respondents, 16.8% avoided these foods because of abdominal distension and discomfort, while 8.8% believed that these foods might produce harmful effects for the fetus.

Table 3 shows the mean total calorie and nutrient intakes expressed as percentages of the DRIs. The average consumption of protein, carbohydrate and fat of pregnant women was within the AMDR of the total calorie intake. The mean daily intakes obtained by the mothers were lower than references for protein, vitamin A, vitamin D, vitamin K, folic acid and calcium .Mean daily intakes of vitamin E, zinc and magnesium were in excess of the recommended values of the standards .

**Table 1. Characteristics of studied pregnant women . (N=103)**

Characteristics	Studied sample	
	N	%
Educational level :		
Illiteracy	4	3.90
Primary	18	17.5
High school	56	54.3
University	25	24.3
Employment status:		
Employed	24	23.3
Housewife	79	76.7
Primary source of nutritional advice:		
Books and internet	5	4.90
Medical staff	49	47.6
Mother/Family	31	30.1
No answer	18	17.4
Eating breakfast :		

Not eating	24	23.3
Rarely eating	31	30.1
Always eating	48	46.6
The primary cause of not eating breakfast is:		
I am eating breakfast always	48	46.6
Lack of time	24	23.3
Lack of appetite	31	30.1
Intake of supplements during pregnancy as:		
Folic acid		
Yes	82	79.6
No	21	20.4
Iron		
Yes	57	55.3
No	46	44.7
Calcium		
Yes	63	61.2
No	40	38.8

**Table 2. Mothers Avoiding Particular Foods during Pregnancy and the Reasons Given for Avoidance .**

<b>Food avoided</b>	<b>N</b>	<b>%</b>
Onions, radishes	11	10.7
Spices	15	14.6
No particular food avoided	77	74.7
<i>Reasons :</i>		
Undesirable effect on fetus	9	8.8
Vomiting, abdominal distension	17	16.5
No definite reason	77	74.7

**Table 3. Average nutrient intake by pregnant women in comparison with Dietary Reference Intakes (DRI) \* ; \*\***

Nutrients	Reference/ Goal	Actual intake(Mean±SD)	%Excess/deficit
Protein (g)	RDA 71	65.2±27.4	- 8.2
	AMDR 10-35% of total kcal		14.0% of Kcal
Carbohydrate (g)	EAR 135	272.6±33.7	59.0% of Kcal
	AMDR 45-65% of total kcal		
Fat (g)	AMDR 20-35% of total kcal	55.9±21.2	27.0% of Kcal
Energy(Kcal)		1854.8±66.1	
Vitamin A (mcg)	EAR 550	255.9 ±30.2	- 53.5
Vitamin D (mcg)	EAR 10	6.0 ±2.62	- 40.0
Vitamin K (mcg)	AI 90	86.0±11.0	-4.4
Vitamin E (mg)	EAR 12	34.7±8.3	189.2
Folic acid (mcg)	EAR 520	210.5±31.8	- 59.6
Iron (mg)	EAR 22	20.8 ±6.4	- 5.5
Calcium (mg)	EAR 800	607.4±43.8	- 39.3
Zinc (mg)	EAR 9.5	22.8±6.0	140.0
Magnesium (mg) :		328.0±18.1	9.3-13.1
	(19-30Y) EAR 290		
	(31-50Y) EAR 300		

\* Acceptable Macronutrient Distribution Range (AMDR) ; Estimated Average Requirement (EAR) ; Recommended Dietary Allowance (RDA) ; Adequate Intake (AI)

### DISCUSSION

The mean interval between pregnancies in this study was 2.6 years (range 1–8) with a mean of previous pregnancies of 2.1 (range 0–11) for each woman. This is not surprising given that family planning is currently well practiced in Jordan (Abu-Moghli *et al.* 2012) . The main source of nutritional advice for pregnant women was medical staff and 79.6% of respondents reported intake of folic acid supplements . Several studies have shown similar results (Abu-Baker and Savage 2011 , Al-Mehaisen *et al.* 2011) .

In this study onions , radishes and spices were avoided by the respondents (Table 2) . This finding is supported by findings reported by Darwish *et al.* (1983) in their study of food habits during pregnancy and lactation in Iraq . In another study conducted in Saudi Arabia, the avoidances included spicy foods and beverages ( Al-Kanhal and Bani, 1995 ).The results of the present study show that most of studied nutrients were found to be inadequate to meet the DRIs. Only the intakes of vitamin E, zinc and magnesium were satisfactory during pregnancy. Similar observations have

also been reported in other studies for protein , calcium , folate ,vitamin A and iron ( Mridula *et al.* 2003 , Cheng *et al.* 2009 , Kavitha *et al.* 2011) .This indicates that the diet of pregnant women was not adequate to meet the requirements of nutrients during the course of pregnancy. The low intake of calcium and vitamin A noted among pregnant women might have been due to the inadequate intake of green leafy vegetables other vegetables and dairy foods. Although 79.6% of respondents reported intake of folic acid during pregnancy (Table 1), their mean intake of folic acid was 59.6% below the EAR. This might also be a result of inadequate amounts of green leafy vegetables and dairy foods in the diet. Similar results were obtained by other studies (Piammongkol *et al.* 2004 , Karandish *et al.* 2005 , Sahoo and Panda 2006 , Aden *et al.* 2007 , Bawadi *et al.* 2010 , Lee *et al.* 2013) .

In this study, the mean daily vitamin D intake of the mothers was 40% below the EAR . Unlike other vitamins, it is very difficult to maintain a normal level of vitamin D from a well-balanced diet. Vitamin D is only available in eggs, liver, oily fish and fortified milk and cereals. As such, regular sun exposure and/or oral supplementation of vitamin D are essential for maintaining normal status.

In this study the mean daily intake of iron was 5.5 % deficit than EAR (Table 3) .This is consistent with the findings of other studies (Peña *et al.* 2003). Sahoo and Panda, (2006) found in a study of nutritional status of pregnant women in India that the mean iron, calcium and folic acid levels were much lower than the RDA . A review of published studies of pregnant women found that micronutrients consumed consistently in amounts substantially less than the RDA were vitamins B<sub>6</sub>, D, and E, folic acid, iron, zinc and magnesium (Rayburn *et al.* 1996 ). Giddens, et al. (2000) found that the mean nutrient intakes were below the EAR for folate, iron,

vitamin E, zinc, and calcium. More recently, Turner, et al.(2003) used 3-day food records to determine whether nutrient intakes from food alone are adequate in pregnant women for middle-to-upper income women. The results showed that the probability of intakes below the EAR were highest for iron, magnesium, zinc, B<sub>6</sub>, selenium and vitamin C (folate intake was not evaluated in their study).

There were limitations for this study. The sample size was small. The study used a convenience sample, which limits its generalisability. Besides , it included women attending primary health care centers in only one region in Jordan (middle part) . Those who received care in other health sectors , and those receiving no care at all were not included . The study used a self-report questionnaire, in which recall bias might be a consideration . Unfortunately, in the study we cannot account the nutrients derived from supplementation . Finally, data entry also has some limitations an information bias may also exist, whereby the information provided by respondents

may have been influenced by the environment in which the interview was being conducted.

## CONCLUSIONS

Under consumption of food and nutrients by pregnant women in the study area was noted. Integrated strategies should be considered to promote increased intake to meet nutrient recommendations. Additionally, pregnant women are at high nutritional risk. Special educational programs are strongly recommended for pregnant women and integrated strategies should be considered to promote increased intakes to meet nutrient recommendations. For some women, supplementation may be required during pregnancy, particularly in the case of calcium, folic acid and iron. Further research at the country level should be undertaken to assess the need for fortification of food with appropriate nutrients.

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## تقييم المتناول الغذائي عند عينة من النساء الاردنيات الحوامل

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### ملخص

أجريت هذه الدراسة بهدف تقييم المتناول من الغذاء والعناصر الغذائية عند عينة من النساء الاردنيات الحوامل ومقارنة هذا المتناول مع القيم المرجعية الموصى بها . تم اختيار 103 من النساء الحوامل تراوحت اعمارهن بين 40 - 18 سنة، من ثلاث مناطق قروية ضمن محافظة البلقاء، الاردن. تم استخدام استبانته بجميع المعلومات من الامهات. بينت النتائج أن المصدر الرئيس لحصول الحوامل على النصائح التغذوية كان من اعضاء الفريق الطبي متبوعا بالامهات وافراد الاسرة الاخرين بنسبة 47.6% و 30.1% على التوالي . كما أظهرت النتائج أن أكثر من 50% من الحوامل لا يتناولن وجبة الافطار بسبب فقدان الشهية. بلغ متوسط التناول الكلي من البروتين والكربوهيدرات والدهون 65.2 غ ، و 272.6 غ و 55.9 غرام في اليوم على التوالي . لوحظ أن متوسط المتناول اليومي من البروتين وفيتامين A وفيتامين D وفيتامين K وحمض الفوليك والكالسيوم كان اقل من القيم المرجعية الموصى بها. بينما كان متوسط المتناول اليومي من فيتامين E والزنك والماغنسيوم أكثر من القيم المرجعية الموصى بها . يستنتج من هذه الدراسة ضرورة وضع استراتيجيات وبرامج تثقيفية خاصة بالنساء الحوامل لتشجيعهن لتناول الكميات الموصى بها من مختلف العناصر الغذائية .

الكلمات الدالة: الحمل ، المتناول الغذائي ، الاردن.

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